APPENDIX B

Soil Boring Logs

KEY TO BORING LOGS

Soil classification in this report is based upon visual and manual field observations which include moisture, consistency, plasticity and grading estimates and should not be construed to imply field or laboratory testing unless presented herein. Soils are classified in accordance with the Unified Soil Classification System. Stratigraphic boundaries are approximate representations only. No warranty is provided as to the continuity of soil strata between borings

| | UNIFIED | SOIL CLAS | SIFI | CAT | ION SYSTEM (USCS) |
|---|--|---------------------------------|------|------------|---|
| | MAJOR DI | VISIONS | | | TYPICAL NAMES |
| :VE | | CLEAN GRAVELS WITH LITTLE OR | GW | | WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES |
| OILS 7 200 SIE | GRAVELS | NO FINES | GP | *** | POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES |
| D SC | More than half coarse fraction is larger than | GRAVELS WITH OVER 12% FINES | GM | | S LTY GRAVE LS, POORLY GRADED GRAVE L-SAND- S LT MIXTURES |
| GRAINED ISLARGER TIV | NO. 4 SIEVE SIZE | | GC | | CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND- CLAY MIXTURES |
| - 5- | SANDS | CLEAN SANDS WITH LITTLE OR | sw | X | WELL GRADED SANDS, GRAVELLY SANDS |
| COARSE RTHANHAL | MORE THAN HALF | NO FINES | SP | | PCORLY CRADED SANDS, GRAVELLY SANDS |
| COA | COARSE FRACTION IS SMALLER THAN NO. 4 SIZE SIEVE | SANDS WITH OVER 12% FINES | SM | | SITY SANDS, POOR LY GRADED SANDSHIT MIXTURES |
| MO | | | sc | | CLAYEY SANDS, POOR LY GRADED SAND-CLAY MIXTURES |
| LS | SILTS ANI | O CLAYS | ML | | NORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAY EY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| SOI #200 S | LIQUIDLIMITL | | CL | | NORGANIC CLAY SOF LOW TO MEDIUM PLASTICITY, OR AVELLY CLAYS, SANDY CLAYS, SITY CLAYS, IFAN CLAYS |
| NEI LF IS | | | OL | | ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| RAJ | SILTS AN | D CLAYS | МН | | NORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS |
| FINE GRAINED SOILS MORE THAN HALF IS < #200 SIR VE | LIQUID LIMIT GRE | EATER THAN 50% | CH | | Norganic Claysof High Plasticity, Fat Clays |
| FI | | | он | | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| H | IGHLY ORGANI | c soils | Pt | | PEAT AND OTHER HIGHLY ORGANIC SOILS |

LEGENDS Not Sampled NS **BLANK CASING** NA Not Analyzed N/A Not Applicable SCREENED CASING No Recovery NR ND Not Detected above the detection limit CEMENT GROUT parts per million CONCRETE TPH Total Petroleum Hydrocarbons as per EPA Method 418.1 BENTONITE SPT Standard Penetration Test USCS Unified Soil Classification System SAND PACK A Measured water level in well FILL MATERIAL __ Estimated water level during drilling

ABBREVIATIONS

BRIX 000991

HAHN ASSOCIATES, INC.

| | | | | ~~~~ | | | | | | | | | |
|------------------------|--------------------|--|--------------------|--|--|--------------------|--------------|-------------|------------------|---|---------------------------|-------------------------|-------------|
| | & ASS | | | INC. | | | | | | | | | |
| 434 NV | V Sixth . | Avenu | ie | | | | SO | Π | BORI | \mathbf{NG} NUMBER \mathbf{B} | -1 | | |
| Portlan | d, Oreg | on | | | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGEI | R: | | | Guy H. Tanz | | DRILL | DRILL |
| PROJE | CT: | | | | SAMP | LING N | METI | OF | D: | 1 5/8-inch Split Spoon | | START | FINISH |
| Brix M | aritime | Comp | any | | DRILI | LING M | ETH | OD | <u> </u> | 2-inch ID Hollow Stem Auger | | Time: | Time: |
| 9030 N | W St. H | elens | Road | | EQUI | PMENT | r TYF | PΕ | | 2-inch ID Minuteman | | 1730 | 1830 |
| | d, Oreg | | <u></u> | | DRILI | | | | | R. Crisman | | Date: | Date: |
| PROJE | CT #: | 2289 | | <u> </u> | DRILI | LING C | ONT | 1 | CTOR: | Crisman Drilling | | 14-Apr-93 | 15-Арт-93 |
| IN | | | 闰 | SIS | (f) | | ਹਿੰ | 田田 | | · · · · · · · · · · · · · · · · · · · | nch OD | | |
| IWE | LE ER | 臣 | SAC C | ANALYSIS (ppm) | E E | (FE) | (fee | NA.I | STRATA (USCS) | | t Applica | | |
| TAL | SAMPLE NUMBER | TIME | ADSPA (ppm) | ANAL, (ppm) | SPT s/0.5 | SAMPLE NTERVA | H | Ę | 'RA' | | t Survey | | |
| ABANDONMENT DETAILS | SA NU | I | HEADSPACE (ppm) | B A | SPT (blows/0.5 feet) | SAMPLE INTERVAL | DEPTH (feet) | GROUNDWATER | ST C | TOP OF CASING ELEVATION: No | t Survey | ed | |
| AB | | | H | LAB | (b) | | P | _ | | SOIL DESCR | IPTION | | |
| | | <u> </u> | | | 二 | <u> </u> | | İ | Concrete | Concrete | | | |
| Bentonite Chips Course | | <u> </u> | <u> </u> | | | ├ | 1 | l | GP | Silty GRAVEL - Brown, moist, l | oose, non- | nlastic, po | orly |
| | | | | | | | 2 | | | Silty GRAVEL - Brown, moist, l graded, no petroleum odor or st | ain | breezes to | , |
| | | Ĺ | | | <u> </u> | İ | | | | | | | |
| [] is [] | | <u> </u> | <u> </u> | <u> </u> | | | 3 | | ****** | | | | |
| lator | | | | - | | - | 4 | | | | - - | | |
| | | | | | | | | | SP | SAND - brown, moist, moderate poorly graded, no petroleum od | ely dense, or or stain | non-plasti (concrete | c, fill) |
| unille | | <u> </u> | 1 | <u> </u> | <u> </u> | 1 | 5 | | | | | • • • • • | • |
| | | | | - | | | 6 | | | | | | |
| | | | <u> </u> | | | | j | | | Boring abandoned due to auger | refusal - | concrete fil | l was |
| | - | <u> </u> | | <u> </u> | | <u> </u> | 7 | | | Boring abandoned due to auger observed in sand to 5.0 feet bgs | | | |
| İ | | | | | | | 8 | | | Boring terminated at 5.0 feet - Boring abandoned with 3/4-incl | 4/14/93 1 Bentonit | e Chips - 4 | /15/93 |
| | | | - | - | | | 9 | | | 0 | | ,o | · |
| l | | 1 | <u> </u> | <u> </u> | ! | | 1 | 1 | | Materials: 3/4 bags 3/4-inch Bentonite Chi | ₩6 | | ! |
| | | | | | <u> </u> | | 10 | | | old page old-men penmine om | .ps | | |
| | i | | | | | - | 11 | | | | | | |
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| TT A TTAY | P. ACC | OCTA | mare 1 | INIC | <u> </u> | | | | | | i | | | |
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| 434 NW | & ASS | | | INC. |] | | ഭവ | TT. | BUBI | NG NUMBER B - 2 | | | | |
| | | | e | | | | 50 | 111 | DOIL | NG NUMBER | | ĺ | | |
| ŀ | d, Orego | DII | | | | o o o o o | | | | O II M | DDW | DDII | | |
| (503) 79 | | | · | | $\vdash -$ | OGGEI | | | | Guy H. Tanz | DRILL | DRILL | | |
| PROJE | | _ | | | | LING N | | | | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| Brix M | | _ | _ | | | ING M | | | <u>:</u> | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 N | | | Road | | | PMENT | TYI | Έ | | Canterra CT-250 | 930 | 1030 | | |
| Portlan | | | | | DRILI | | | | | M. Reniker | Date: | Date: | | |
| PROJE | C'I' #: | 2289 | | ı | DRILL | ING C | ONT | 1 | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 | | |
| ABANDONMENT DETAILS | . 1 | | 展 | LAB ANALYSIS HCID (ppm) | et.) | Y | £ | GROUNDWATER | } | BORING DIAMETER: 10-inch OI | | | | |
| IN | 田田 | 臼 | A C | | i fe | ER | (fee | X | IA S) | CASING DIAMETER: Not Applic | | | | |
| I Š₹ | M M | TIME | ADSPA (ppm) | N O | SPT g/0.5 | (%) | H | Á | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | | | |
| | SAMPLE NUMBER | H | HĘADSPACE (ppm) | AB ANALYSI HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | ĮĘ. | S S | TOP OF CASING ELEVATION: Not Applic | able | | | |
| AB. | , , | | H | M T | ≅ | PE | <u> </u> | E CE | | SOIL DESCRIPTION | • | j | | |
| H : Y | | | | <u> </u> | | | | | Asphalt | Asphalt | | | | |
| Concrete : | | | | | | | 1 | | | • | | | | |
| .⊞§⊞ | | | | | | | | | | | | | | |
| かが思 | <u></u> | | <u> </u> | <u> </u> | <u>!</u> | | 2 | } | ************************************** | Silty GRAVEL with some Sand - brown, | moist, medi | .um | | |
| | | | | | | | 3 | | | dense, non-plastic, slightly graded, no pe stain | troleum odo | or or | | |
| | | | | | | | | | | | | I | | |
| | | | <u> </u> | <u> </u> | | <u> </u> | 4 | 1 | | | | | | |
| | | | | | | | 5 | | | | | ļ | | |
| | | | | | 4 | 100 | | 1 | | SAND - brown moist medium dense no | n-plactic p | norty | | |
| | 15-001 | 945 | 3.7 | NA. | 9 | 100 | 6 | ┨ | SP | SAND - brown, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | | |
| | | | | | 15 | 100 | 7 | | | | | | | |
| | | | 1 | | | | | 1 | | | | Ì | | |
| | 15-002 | 0.50 | 0.0 | 1 374 | 9 | 80 | 8 | | | SAND - as above, no petroleum odor or s | tain | 1 | | |
| | 15-002 | 950 | 3.8 | NA | 12 | 100 | 9 | | | · | | | | |
| Whips | | | | <u> </u> | 122 | | | 1 | | | | | | |
| W O 88 | | i . | | | | | 10 | | | | | | | |
| Bentonite | 15-003 | 1005 | 3.9 | ND | 7 | 100 | 11 | | SP | SAND - as above, no petroleum odor or s | tain | | | |
| Sent W | 19-009 | 1005 | 3.9 | 1113 | 5 | 100 | <u> </u> | 1 | | | | | | |
| | | | | | | | 12 | | | | | Ì | | |
| | | | | <u> </u> | | | 1. | | 370,230 | | | | | |
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| | | | | | |] | | | | | | | | |
| | | <u> </u> | 1 | 3 | 100 | 15 | 4 | | SAND - as above, strong petroleum odor | and blast | | | | |
| | 15-004 | 1010 | 4.1 | NA | 4 | 100 | 16 | | SP | SAND - as above, strong petroleum odor stain | and diack | | | |
| | | | | | 6 | 100 | | 1 | | | | | | |
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| | | | | | - | ļ <u> </u> | 18 | | | | | į | | |
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| | d, Orego | | _ | | | | e. | | | | | |
| (503) 7 | - | 211 | | | HATT | OGGEI | | | · | Guy H. Tanz | DRILL | DRILL |
| PROJE | | | | | | LING N | | TOT | · | 2 5/8-inch OD Split Spoon | START | FINISH |
| | aritime (| Comp | anv | | | JING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 1 | W St. H | - | - | | | PMENT | | | • | Canterra CT-250 | 930 | 1030 |
| | d, Orego | | LWAU | | DRILI | | | 121 | | M. Reniker | Date: | Date: |
| PROJE | | 2289 | -, | | | ING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| E | | | | <u>8</u> | · | | | 2 | | BORING DIAMETER: 10-inch O | D | |
| VEN S | 田田 | | VCE | ALYSI (ppm) | feet | RY | eet | ATE | 4 ∽ | CASING DIAMETER: Not Appli | cable | |
| NO. | IPL (BE | TIME | ADSPA (ppm) | AI P | SPT s/0.5 | (%) | H(t | DW. | KAT | SURFACE ELEVATION: Not Surve | | |
| NO THE | SAMPLE NUMBER | TI | HEADSPACE (ppm) | AB AN HCID | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | 5 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Appli | cable | *, |
| ABANDONMENT DETAILS | 5. Z | | HE | LAB ANALYSIS HCID (ppm) | 99 | 2 | Ä | GROUNDWATER | | SOIL DESCRIPTION | | |
| | | | | _ | 8 | 100 | | | inidia elim | SOIL DESCRIPTION | | |
| | 15-005 | 1020 | 4.1 | ND | 13 | 100 | 21 | | SP | SAND - brown, moist, medium dense, n slightly graded, strong petroleum odor | on-piastic, and black | , |
| | | | | | 11 | 100 | 22 | | | stain | | |
| | | <u> </u> | <u> </u> | 1 | | <u> </u> | , 22 | | | | | |
| ll sd | | | | | | | 23 | | | | | |
| | | · · · · · · · · · · · · · · · · · · · | <u> </u> | <u> </u> | <u> </u> | | 24 | 15/93 | | | | |
| Bentonite Chips | | | <u> </u> | <u> </u> | <u>. </u> | ! | 23 | 12 | | | | |
| Marto M | | | | | | | 25 | | | | | |
| | 15-006 | 1030 | 4.2 | ND | 5 | 100 | 26 | | | Silty CLAY - gray, wet, stiff, medium pl poorly graded, no petroleum odor or sta | lastic, in | |
| | 10 000 | 1000 | 1 | 112 | 8 | 100 | <u></u> | 1 | | prompt general, no postoroum odor or osa | ••• | |
| | | | | | | | 27 | | | | | |
| · 1 | | | <u> </u> | | | - | 28 | | | | | |
| | | | | | | ! ! | | | | | | |
| | | | | <u> </u> | | <u> </u> | 29 | | | Boring terminated at 25.0 feet - 4/15/93 | , | · |
| ļ l | | | <u> </u> | <u> </u> | <u> </u> | | 30 | | | Sampled to 26.5 feet | | 1 /1 E /00 |
| | | | | | ļ | | | 1 | | Boring abandoned with 3/4-inch Benton | nte Chips - 4 | F/19/99 |
| | <u> </u> | | <u> </u> | <u> </u> | | <u> </u> | 31 | 1 | , | Materials: | | |
| | | | l | - | | | 32 | | | 12 bags 3/4-inch Bentonite Chips | | |
| | | | | <u> </u> | | | | 1 | | • | | i |
| | | | <u> </u> | <u> </u> | | <u> </u> | 33 | 1 | | | | |
| 1 | | | <u> </u> | <u> </u> | | | 34 | | | | | |
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| | | <u> </u> | <u> </u> | 1 | | <u> </u> | 35 | | | | | |
| | | | | <u> </u> | | | 36 | | | | | |
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| | | | <u>l</u> i | | <u> </u> | <u> </u> | 37 | - | | | | |
| 1 | | | | | <u> </u> | <u> </u> | 38 | | | | | |
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| • | l | | <u> </u> | <u> </u> | | 1 | 39 | 1 | | | | |
| | | | | | | | 40 | | | | | |

| H | & ASS | INC. | | | ~~ | | DOT: | | | | | | | | |
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| 1 | id, Orego | n | | | | | | | | | · · · · · · · · · · · · · · · · · · · | | | | |
| | 96-0717 | | | - | 1 | OGGEI | | | | Guy H. Tanz | DRILL | _ | | | |
| PROJE | | ~ | | | | LING N | | | | 2 5/8-inch OD Split Spoon | START | | | | |
| - I | aritime | _ | • | | | ING M | | | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | | |
| 1 | W St. H | | Koad | | | PMENT | YYY | Έ <u></u> | | Canterra CT-250 | 1030 | 1115 | | | |
| Portlan | id, Orego | on 2289 | | | DRILI | LER: LING C | ONT | PΛ | СТОВ | M. Reniker Geo-Tech Explorations, Inc. | Date: | Date: | | | |
| t | /CI #. | 2203 | | 70 | נתואת | | ONI | 1 | olon. | BORING DIAMETER: 10-inc | 15-Apr-9 | 3 15-Apr-93 | | | |
| EN | E 202 | | CE | 15. E | eet) | ξ <u>Υ</u> | et) | GROUNDWATER | | | | | | | |
| I I I | PLE | 图 | ADSPA (ppm) | ALYSI (ppm) | T. | VEF | ej)] | WA | STRATA (USCS) | | oplicable | | | | |
| OFF | | TIME | 38 | SPT vs/0.5 | COV. | Ħ. | Z | TR/ US | TOP OF CASING ELEVATION: Not A | rveyed | | | | | |
| ין אָבּ | ABANDONMENT DETAILS SAMPLE NUMBER TIME (ppm) LAB ANALYSIS HCID (ppm) SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) | | | | | | | | S C | TOP OF CASING ELEVATION: NOT A | phicanie | | | | |
| | | | - | [4] | | | | 5 | | SOIL DESCRIPTION | | | | | |
| Concrete | | | | | <u> </u> | | ١, | | Asphalt | Asphalt | , | | | | |
| 開讀畫 | | | | <u> </u> | | <u> </u> | | | | | | | | | |
| | | | | | | | 2 | | | Ciles Of ANTIL Side and Complete | | 11 | | | |
| | | | <u> </u> | | <u> </u> | | 3 | | 6 GP 8 | Silty GRAVEL with some Sand - bro dense, non-plastic, slightly graded, i | own, moist, me 10 petroleum o | dor or | | | |
| | | | | <u> </u> | <u> </u> | | 9 | | | stain | | | | | |
| | | | | | | | 4 | | | | | | | | |
| | | | | | | <u> </u> | 5 | | | | | | | | |
| | | | <u> </u> | <u> </u> | 4 | 80 | " | 1 | | SAND - brown, moist, medium dense, non-plastic, poorly | | | | | |
| | 15-007 | 1030 | 4.3 | NA | 8 | 100 | · 6 | | SP | graded, no petroleum odor or stain | c, non-prasuc, | hoorth | | | |
| | | | <u> </u> | | 20 | 100 | 7 | ļ | | | | | | | |
| | | | <u> </u> | <u>!</u> | <u> </u> | <u> </u> | | { | | | | | | | |
| | | | | | | | 8 | | | | | | | | |
| | | | <u> </u> | ļ <u> </u> | <u> </u> | | 9 | | | | | | | | |
| Chips | | | ! <u> </u> | <u> </u> | <u> </u> | <u> </u> | 9 | 1 | | | | | | | |
| | | - | | | | | 10 | | | | | | | | |
| Bentonite (| 15-008 | 1035 | 3.4 | NA | 5 | 100 | 11 | | SP | SAND - as above, no petroleum odor | or stain | • | | | |
| | 15-008 | 1090 | 3.4 | I | 5 | 100 | 11 | - | | | | | | | |
| | | | | | | | 12 | | | | | | | | |
| | | | | | | <u> </u> | 10 | | | | | | | | |
| | | | <u> </u> | ļ | <u> </u> | i | 13 | 1 | | | | | | | |
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| | | | | | | | | | | | | | | | |
| | | | <u> </u> | <u> </u> | 4 | 20 | 15 | 1 | | SAND - as above, strong petroleum | odor and blook | | | | |
| | 15-009 | 1040 | 4.5 | NA | 4 | 100 | 16 | | SP | stain | out and that | ` | | | |
| | | | | | 8 | 100 | | | | | | | | | |
| | | | | <u> </u> | <u> </u> | | 17 | { | | | | | | | |
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| | HAHN 434 NW | | | | INC. | - | | SO | TL. | BORI | NG NUMBER B - 3 | | |
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| | Portlan | | | | | | | | | | | | |
| | (503) 79 | _ | | | | HAI L | OGGEF | : | | | Guy H. Tanz | DRILL | DRILL |
| | PROJE | CT: | | | | SAMP | LING N | ÆTI | IOI |): | 2 5/8-inch OD Split Spoon | START | FINISH |
| | Brix Ma | eritime | Comp | any | | DRILI | LING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| | 9030 N | W St. H | elens : | Road | | EQUI | PMENT | TYF | E | | Canterra CT-250 | 1030 | 1115 |
| | Portlan | | | | | DRILI | | | | | M. Reniker | Date: | Date: |
| | PROJE | CT #: | 2289 | | 1 | DRILI | LING C | ONT | RA(| CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| | L | | | 闰 | SIS (1 | et. | 54 | ÷ | ER | | BORING DIAMETER: 10-inch OI | | |
| 7 | LS | H H | 田 | AC (1 | TX | fe. | ER | ee) | VΑΤ | STRATA (USCS) | CASING DIAMETER: Not Applic | | |
| - | NOT | MB | TIME | ADSPA (ppm) | NA DA | SPT s/0.5 | (%) | ľH | Ď | RA' | SURFACE ELEVATION: Not Surve | | |
| | ABANDONMENT DETAILS | SAMPLE NUMBER | Ţ | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ST (C | TOP OF CASING ELEVATION: Not Applic | able | |
| - | A.B. | | | H | YI H | | | О | GR | | SOIL DESCRIPTION | Ī | |
| _ | | 15-010 | 1050 | 4.2 | ND | 10 | 100 | 21 | | SP | SAND - brown, moist, medium dense, no poorly graded, strong petroleum odor an | n-plastic, d black | |
| ļ | | | | | | 5 | 100 | | | | stain | | |
| | | | | <u> </u> | | | | 22 | | | | | |
| | | | | | | | | 23 | | | | | |
| _ | Chips (Chips | | | | | | | | | | | | |
| | | | <u> </u> | | | | | 24 | 3 | | | | |
| | Bentonite | - | <u> </u> | | | | | 25 | 15/93 | | | | j |
| - | | | | | ,,,, | 2 | 2 100 | | | CL | Silty CLAY - gray, wet, stiff, medium plo poorly graded, no petroleum odor or stai | asti c , | |
| _ | WWW. | 15-011 | 1100 | 4.1 | ND | 3 5 | 100 | 26 | Y | | poorly graded, no petroleum odor or star | n |] |
| | | | | | | | 100 | 27 | | | | | |
| _ | | | | | | | | | | | | | ļ |
| ~ | | | | <u> </u> | <u> </u> | | | 28 | | | | | |
| | | | <u> </u> | i | <u> </u> | <u> </u> | | 29 | 1 | | Boring terminated at 25.0 feet - 4/15/93 | | |
| | | | <u> </u> | | <u> </u> | | 1 | 30 | | | Sampled to 26.5 feet Boring abandoned with 3/4-inch Benton | ite Chips - 4 | 1/15/93 |
| | | - | : | | | | <u> </u> | 31 | | | Materials: | | |
| _ | | • | | | | | | 32 | | | 12 bags 3/4-inch Bentonite Chips | | |
| | | | | ļ | | | | 33 | | | | | |
| | | | | - | <u> </u> | | <u> </u> | 33 | 1 | | | | |
| _ | | | | <u> </u> | | | | 34 | | | | | |
| | | | | | | | | 35 | | | | | |
| _ | | | | | | | | 36 | | | | | |
| | | • | | <u> </u> | | | | | | | | | |
| _ | | | | 1 | | | | 37 | 1 | | | | |
| - | | | | | | | | 38 | | | | | |
| _ | | | | - | - | | | 39 | | | | | |
| _ | | | | | | | | | 1 | | | | |
| | | | ļ | 1 | 1 | 1 | Í | 40 | 1 | | | | i |

Updated: 6/23/93 JWD

Page 2 of 2

File: B-3 2289

Updated: 6/23/93 JWD

Page 1 of 2

F116: P-4-7292 -

| | 0 400 | 30T 4 | nome of 3 | INIC | | | | | | | | ····· |
|------------------------|-------------------|--------------|--|--|--|--|--------------|-------------|--------------------------|---|--------------|-----------|
| М | & ASSO Sixth A | | - | LINC. | <u> </u> | | gn | TT | ומ∩מ | NG NUMBER B - 4 | | • |
| • | | | e | |] | | ъυ | | DUL | ING HUMDER D - 4 | | |
| Portlan | _ | n | | | <u> </u> | | | | | - TT - | | |
| (503) 79 | | | | | | OGGEI | | | <u>.</u> . | Guy H. Tanz | DRILL | DRILL |
| PROJE | | | | ! | | LING I | | | | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix Ma | | - | | | DRILI | LING M | ETH | OD |): | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 9030 N | W St. H | elens : | Road | | EQUI | PMENT | TYI | PE | | Canterra CT-250 | 1130 | 1220 |
| Portlan | | | | <u> </u> | DRILI | | ± | | | M. Reniker | Date: | Date: |
| PROJE | CT #: | 2289 | | | DRILI | LING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| Į. | | İ | 闰 | SIS | et.) |) | ⊕ | ER | | BORING DIAMETER: 10-inch OD | | <u> </u> |
| ESE L | EE | _E | AC () | ALYSI (ppm) | i fee | EK | (fee | VAT | EA Si | CASING DIAMETER: Not Applica | able | |
| I SA | MP | TIME | ADSPA (ppm) | NA C | SPT s/0.5 | [8 O] | H | Ď | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| ABANDONMENT DETAILS | SAMPLE NUMBER | H | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ST. | TOP OF CASING ELEVATION: Not Applica | able | |
| AB | 7 | | 田 | IAH H | | | | | | SOIL DESCRIPTION | | |
| | | | | - | | _ | - | F | Asphalt | Asphalt DESCRIPTION | | |
| Concrete: | | | | | | | 1 1 | | | • | | |
| ⋒ ⋛∰ | | 2 G | | | | | | | | Silty GRAVEL with some Sand - brown, r dense, non-plastic, slightly graded, no pet | noist, medi | um |
| 影が別 | | | | | | | | | | dense, non-plastic, slightly graded, no pet stain | roleum odo | or or |
| | 3 | | | | | | | | | | | |
| | | | | | | | | 1 | | | | |
| | | | <u> </u> | <u> </u> | 5 | | | | | | | |
| | | | | | | | | | NG PRO | | | |
| | 17.000 | 1.5. | 0.7 | | 4 | 20 | _ | | SP | SAND - brown, moist, medium dense, no | n-plastic, p | oorly |
| | 15-012 | 1130 | 3.7 | NA | 10 | 100 | 6 | 4 | | graded, no petroleum odor or stain | | |
| | | | | 1 | 1 | 1.50 | 7 | 1 | 8360A 8623 | | | ı |
| | | | | | | | Ï | 1 | | | | İ |
| | <u> </u> | | | | ļ | <u> </u> | 8 | 4 | | | | |
| | | | | - | | | 9 | | fx250000 8888000 | | | ļ |
| Chips | | | | | | <u> </u> | | 1 | | | | : |
| | | | | 1 | - | 100 | 10 |) | | | | ı |
| William Bentonite | 15-013 | 1140 | 3.5 | NA | 8 | 100 | 11 | | ŠP | SAND - as above, no petroleum odor or st | tain | |
| | | | | | 9 | 100 | | 1 | | | | |
| | | | | | | | 12 | | | | | |
| | | | | - | | | 13 | | | | | |
| | | | | | | | 1.0 | 1 | | | | |
| | | | | | | | 14 | | | | | |
| | | | | | | | 10 | | | | | |
| | | | | | 12 | 100 | 15 | 1 | | SAND - as above, no petroleum odor or s | tain | |
| | 15-014 | 1150 | 3.9 | NA | 13 | 100 | 16 | | SP | SALTE - AS ABOVE, NO PEN OLEMIN OURS OF S | udili | |
| | | | | | 12 | 100 | | 1 | | | | |
| | | | · | <u> </u> | <u> </u> | | 17 | - | P30010 htt. 8 7200600 | | | |
| | | | | | | | 18 | 1 | | | | |
| | | | | | | | | 1 | | | | |
| | | | | | | | 19 | - | | | | |
| 20 | | | | | | | | | | | | |
| | | | | | | | | | | • | | |

| | 434 NW | & ASSO Sixth A d, Orego | Avenu | - | INC. | | | SO | ΙL | BORI | NG NUMBER B - 4 | | : |
|-----|------------------------|-------------------------------|---------------------------------------|--|----------------------------|-------------------------|--|--------------|-------------|------------------|---|--------------------------|-----------|
| ł | (503) 79 | - | - ** | | | HAI L | OGGEI | ₹; | | | Guy H. Tanz | DRILL | DRILL |
| Hŧ | PROJE | | | | | | LING N | | IOI |): | 2 5/8-inch OD Split Spoon | START | FINISH |
| | | aritime (| Compa | any | | | ING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| | | W St. H | _ | | | | PMENT | | | | Canterra CT-250 | 1130 | 1220 |
| H | | d, Orego | | | | DRILI | | | | ······ | M. Reniker | Date: | Date: |
| - 6 | PROJE | | 2289 | | | | ING C | ONT | RA(| CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| ıj | E | | | 6.7 | Ω | | | | Ж | | BORING DIAMETER: 10-inch O | D | |
| | SEN | 田麗 | | CH | ALYSI (ppm) | feet | RY | eet | A'TE | ¥ (| CASING DIAMETER: Not Applie | cable | |
| _ | ARE | IBE | TIME | ADSP/ (ppm) | ₹ē | SPT s/0.5 | OVE | H (f | DW. | AT | SURFACE ELEVATION: Not Surve | | |
| | NET SET | SAMPLE NUMBER | II | HEADSPACE (ppm) | AB AN HCID | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | Į. | STRATA (USCS) | TOP OF CASING ELEVATION: Not Appli | | <u> </u> |
| | ABANDONMENT DETAILS | or Z | | HE | LAB ANALYSIS HCID (ppm) | (blo | RI | H | GROUNDWATER | - | anti pragrituro | Ť | |
| | | | | <u> </u> | <u> </u> | 10 | 20 | <u> </u> | \vdash | William barren | SOIL DESCRIPTION | | |
| | | 15-015 | 1158 | 4.4 | ND | 11 | 100 | 21 | | SP | SAND - brown/gray, moist, medium der plastic, poorly graded, no petroleum odo | ise, non- or or stain | |
| | | | | | | 9 | 100 | | | | | | |
| | | | | <u> </u> | | <u> </u> | <u> </u> | 22 | | | | | |
| ij | | | | | | | | 23 | | 33.4 | | | |
| _ | () tig | | | | ļ <u> </u> | | | | 793 | | | • | |
| | ite | | | <u> </u> | <u> </u> | 1 | | 24 | 4/15/9 | | , in the second | | |
| • | Bentonite Chips | | | | | | | 25 | | | | | |
| | Bg | 17.010 | 100" | 0.7 | 774 | 0 | 100 | | | CL | Silty CLAY - gray, wet, soft, medium pl poorly graded, no petroleum odor or sta | astic, | |
| | | 15-016 | 1205 | 3.7 | NA | 1 1 | 100 | 26 | 1 | | poorly graded, no petroleum odor or sta | in . | |
| | | | | | | | | 27 |] | | | | ! |
| ı | | | | | | | | | | • | | | ! |
| | | | | <u> </u> | 1 | - | | 28 | 1 | | | | |
| | | | | | | | | 29 |] | | | | |
| l | | | | | | | | 90 | 1 | | Boring terminated at 25.0 feet - 4/15/93 Sampled to 26.5 feet | | |
| • | | | | <u>! </u> | <u> </u> | 1 | <u>i</u> İ | 30 | 1 | | Boring abandoned with 3/4-inch Bentor | ite Chips - 4 | 1/15/93 |
| ı | | | | | | | | 31 | | | Materials: | | |
| ı | ! | | | | | | | 20 | | | Materials: 12 bags 3/4-inch Bentonite Chips | | |
| | | | | | <u> </u> | 1 | <u> </u> | 32 | 1 | | | | |
| l | | | | | | | | 33 | | | | | |
| • | | | | | | | | 9, | | | | | |
| ا ۱ | | | · · · · · · · · · · · · · · · · · · · | - | <u> </u> | <u> </u> | | 34 | 1 | | · | | |
| | | | | | | | | 35 | | | | | |
| | | | | | | | | - | | | | | |
| ı | | | | | | _ | <u> </u> | 36 | 1 | | | | |
| | | | | | | <u> </u> | - | 37 | | | | | |
| | ! | | | | | | | | 1 | } | | | |
| l | | | - | <u> </u> | | | | 38 | 1 | | | | |
| | | | <u> </u> | | - | | | 39 | | | | | |
| ı | ľ | | | | | | | | 1 | 1 | | | |
| | | | i | 1 | 1 | 1 | i | 40 | 4 | I | 1 | | |

| 434 NW | & ASSO | INC. | | | NG NUMBER B - 5 | | | | | | | |
|------------------------|-----------|----------------|--|----------------------------|--|-----------------|--------------|-------------|------------------|--|----------------------------|-----------|
| J | d, Orego | n | | | | | | | | T MITT D | T | |
| (503) 79 | | | | | | OGGE | | T = 1 | | Jeff W. Doss | DRILL | DRILL |
| PROJE | | | | | | LING I | | | | 2 5/8-inch OD Split Spoon | START | FINISH |
| J | aritime (| _ | | | | ING M | | | <u>:</u> | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 9030 N | | | Koad | | <u> </u> | PMENT | TYP | Έ | | Canterra CT-250 | 1315 | 1405 |
| | d, Orego | | | | DRILI | LER: LING C | ONTE | DA | OTTOD | M. Reniker | Date: | Date: |
| PROJE | CT#: | 2289 | <u> </u> | | DRITT | TING C | 1 | i | CIOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| ABANDONMENT DETAILS | | | 舆 | LAB ANALYSIS HCID (ppm) | et. | بح | भ | GROUNDWATER | | BORING DIAMETER: 10-inch OI | | |
| | SAMPLE | Œ | PAC C | I Id | 7 5 | E (| E E | WA | STRATA (USCS) | CASING DIAMETER: Not Applie | | |
| | ME | TIME | ADSPA (ppm) | NA D | SPT 's/0.5 | % % % | TH | Ē | RA JSC | SURFACE ELEVATION: Not Surve | | |
| | SA | Ε. | HEADSPACE (ppm) | AB ANALYSI HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | D | N N | TOP OF CASING ELEVATION: Not Applic | able | |
| | } | | F | N. | ⊖ | | | F |] | SOIL DESCRIPTION | Ī | |
| Concrete | | | | | | | | | Asphait | Asphalt | | |
| 田豊田 | | ** | | | 1 | <u> </u> | 1 | | | | | |
| 囲き田 | | | <u> </u> | | | - | 2 | | GP 8 | Silty GRAVEL with some Sand - brown, dense, non-plastic, slightly graded, no pe | moist, medi troleum odo | um |
| | <u> </u> | | | | | | | | | stain | or orcam out | |
| | | | | 1 | 1 | | 3 | l | | | | |
| | | | | - | <u> </u> | | 4 | | | | | |
| | <u></u> | | | | | <u> </u> | | | | | | |
| | | | | | | | 5 | | | | | |
| | 15-017 | 1997 | 2 | NA | 6 | 80 | 6 | | SP | SAND - brown, moist, medium dense, no graded, no petroleum odor or stain | n-plastic, p | porly |
| | 10-017 | 1021 | | 1122 | 6 | 100 | | ĺ | | graded, no perform odor or stant | | |
| | | | | | | | 7 | | | | | |
| | | | | ļ | | | 8 | | | | | |
| | · | | <u>'</u> | | | - | | | | | | |
| | | | | | | | 9 | ļ | | | | |
| Chips | | | | | <u> </u> | <u> </u> | 10 | | | | | |
| | <u> </u> | | <u>) </u> | | 6 | 0 | 10 | | | SAND - as above, no petroleum odor or s | tain | |
| Millinii Bentonit | 15-018 | 1333 | 1.8 | ND | 11_ | 100 | 11 | | SP | SAND - as above, no penoienm odor or s | tam | |
| | | | | | 14 | 100 | 1.0 | | | | | |
| | | | | <u> </u> | <u> </u> | | 12 | | | | | |
| | | | - | | - | | 13 | | | | | |
| | | | | | | | | | | | | |
| | <u> </u> | | ļ | <u> </u> | <u> </u> | | 14 | | | | | ı |
| | | | | | - | | 15 | | | | | 1 |
| | | | | | 6 | 0 | | 1 | SP | SAND - as above, no petroleum odor or s | stain | |
| | 15-019 | 1339 | 2.2 | NA | 8 | 100 | 16 |] | | | | |
| | | | | | 12 | 100 | 17 | | | | | |
| | | | <u> </u> | | | | | | | | | Ì |
| | | | | | | | 18 | | | | | |
| | | - - | | | <u> </u> | ļ | 19 | | | | | |
| | | | | | | | 13 | 1 | | | | |
| WIIIII | | | | | | | 20 | l | | | | |

| HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue | SOIL BO | RING NUMBER B - 5 | | | | | |
|--|---|---|---------------|-----------|--|--|--|
| Portland, Oregon | 1 | | | | | | |
| (503) 796-0717 | HAI LOGGER: | Jeff W. Doss | DRILL | DRILL | | | |
| PROJECT: | SAMPLING METHOD: | 2 5/8-inch OD Split Spoon | START | FINISH | | | |
| Brix Maritime Company | DRILLING METHOD: | 4 1/4-inch ID Hollow Stem Auger | | Time: | | | |
| 9030 NW St. Helens Road | EQUIPMENT TYPE | Canterra CT-250 | 1315 | 1405 | | | |
| Portland, Oregon | DRILLER: | M. Reniker | Date: | Date: | | | |
| PROJECT#: 2289 | DRILLING CONTRACTO | | 15-Apr-93 | 15-Apr-93 | | | |
| E S | 3 8 | BORING DIAMETER: 10-inch OD | | | | | |
| SE SE SE SE SE SE SE SE SE SE SE SE SE S | RY RY ATTE | | | | | | |
| ABANDONMENT DETAILS SAMPLE NUMBER TIME (Ppm) LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER STRATA | SURFACE ELEVATION: Not Surveyed | | | | | |
| | SI WEST | TOP OF CASING ELEVATION: Not Applica | | | | | |
| HE HE S N HE HE | BE DE | | | | | | |
| T I | | SOIL DESCRIPTION | | | | | |
| 15-020 1345 2.1 ND | 4 20 5 S | SAND - brown/gray, medium dense, non- slightly graded, no petroleum odor or stai | plastic, | | | | |
| | 7 100 | \$200 . | | | | | |
| | 22 | | | ļ | | | |
| | 23 | ` ` | | 1 | | | |
| | | | | | | | |
| | 24 | | | ľ | | | |
| | 25 | | | 1 | | | |
| | | Boring terminated at 20.0 feet - 4/15/93 Sampled to 21.5 feet | | ł | | | |
| | 26 | Boring abandoned with 3/4-inch Bentonit | te Chips - 4/ | /15/93 | | | |
| | 27 | J | | | | | |
| | - 21 | Materials: 10 bags 3/4-inch Bentonite Chips | | [| | | |
| | 28 | and a suppose of the | | Ì | | | |
| | 29 | | | 1 | | | |
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| | 30 |] | | | | | |
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| | 32 | İ | | ŀ | | | |
| | 20 | | | 1 | | | |
| | 33 | 1 | | J | | | |
| | 34 | | | j | | | |
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| | 35 | 1 | | ł | | | |
| | 36 | | | | | | |
| | | | | J | | | |
| | 37 | | | j | | | |
| | 38 | | | | | | |
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| | 39 | | | ļ | | | |
| | 40 | | | j | | | |

| 77 4 7727 | P. ACC | OCTA | TES 1 | INIC | | | | | | | , | | |
|------------------------|------------------|--|--|--|--|-----------------|--------------|-------------|------------------|---|---------------|-------------|--|
| HAHN 434 NW | & ASS | | - | INC. | | | gn | TT. | R∩Ri | NG NUMBER B - 6 | | | |
| 1 | | | ਦ | | | | JU | A.I | DOIV | 143 HOMEDER D. O | | | |
| | d, Orego | on | | | **** | 0000 | | | | T CCTT D | I DDIII I | DDITT | |
| (503) 79 | | | | | | OGGE | | TOT | <u> </u> | Jeff W. Doss | DRILL | DRILL | |
| PROJE | | G- | | | | LING N | | | | 2 5/8-inch OD Split Spoon | START | FINISH | |
| | aritime (| _ | | | | JNG M | | | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | |
| 9030 N | | | Road | | | PMENT | TYI | Έ | | Canterra CT-250 | 1420 | 1515 | |
| Portlan PROJE | | on 2289 | | | DRILI | ÆR: JING C | ONT | 1D A / | OTOD. | M. Reniker Geo-Tech Explorations, Inc. | Date: | Date: | |
| | O1 #: | 4409 | | T-0 | ויודאת | MAG C | <u> </u> | Τ_ | JIOK: | | 15-Apr-93 | 15-Apr-93 | |
| ABANDONMENT DETAILS | دہ ۔۔ | | 图 | LAB ANALYSIS HCID (ppm) | et) | × | et: | GROUNDWATER | ٠. | BORING DIAMETER: 10-inch OI | | | |
| | SAMPLE NUMBER | 囯 | B PA(| IZ Ed | 1 5 E | 題(| (E | WA' | STRATA (USCS) | CASING DIAMETER: Not Applic | | | |
| O. P. | NE NE | TIME | ADSPA (ppm) | ŽĚ | SPT 8/0.5 | % % % | HT | 2 | JSC JSC | SURFACE ELEVATION: Not Survey | | | |
| Į Ž | S N | ָרָ. | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | no | 25 | TOP OF CASING ELEVATION: Not Applic | able | | |
| | | ! | P | ¥ | 9 | | [4 | GB | | SOIL DESCRIPTION | · | | |
| HUH | | | | | <u> </u> | | | | Asphalt | Asphalt | | | |
| H i H | Concrete = | | | | | | | | | | | | |
| 田夏田 | | | | - | } | ! | 2 | 1 | GP 8 | Silty GRAVEL with some Sand - brown, a dense, non-plastic, slightly graded, no per | moist, medi | um r or | |
| | | | | | | | | | | stain | or orough out | | |
| | | | | | <u> </u> | <u> </u> | 3 | | | | | | |
| | <u> </u> | | | | | | 4 | | | | | į | |
| | | | <u>. </u> | | 4 | | | | | · | | | |
| | | | | | | | 5 | | | | | | |
| | 15-021 | 140= | 2.7 | NT A | 2 | 0 | ١, | | SP | SAND - brown, moist, very loose, non-pla graded, no petroleum odor or stain | astic, poorly | · | |
| | 15-021 | 1425 | 2.7 | NA | 1 1 | 20 | 6 | - | | graded, no petroleum odor or stam | | | |
| | | <u>. </u> | - | | - | 100 | 7 | 1 | | | | | |
| | | | | <u> </u> | | | | | | | | | |
| | | | (| <u> </u> | | <u> </u> | 8 | | | | | | |
| | | | | | <u> </u> | | 9 | | | | | | |
| hips | | | <u> </u> | | Ì | | i | 1 | | | | | |
| 10000 | | | | | | | 10 | | | | | | |
| Bentonite | 15-022 | 1431 | 2.4 | ND | 2 | 100 | 11 | | SP | SAND - as above, gray, petroleum odor a | nd stain | | |
| [] sent | 15-022 | 1431 | 2.4 | I ND | 2 | 100 | 1 11 | 1 | | | | | |
| | | | | | | | 12 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | 13 | | | | | | |
| | | | | - | <u> </u> | <u> </u> | 14 | | | | | | |
| | | | | | | | | 1 | | | | | |
| | | | | | | 1 | 18 | 1 | | | _ | | |
| | 15 000 | 1437 | 0.5 | ATTS | 9 | 0 | 1, | | SP | SAND - as above, medium dense, petrole and stain | eum odor | | |
| | 15-023 | 1437 | 2.5 | ND | 11 15 | 100 | 16 | 1 | | and stain | | | |
| | | <u> </u> | - | - | 10 | 1.50 | 17 | 1 | | | | | |
| | | | | | | | | 1 | | | | | |
| | | | <u> </u> | | <u> </u> | | 18 | 1 | | | | | |
| | | | - | - | | | 19 | | | | | | |
| | | | - | - | <u> </u> | <u> </u> | 13 | 1 | | | | | |
| | | | | 1 | | | 20 | | | | | _ ! | |

| HAHN & ASSOCIATES, INC. | | | | | | | | | | | | | |
|-------------------------|------------------------|------------------|--|--|--|--|--|--------------|---------------|--|--|-------------------------|-----------|
| -8 | | | | | INC. | | | | | | | | |
| | 434 NW | Sixth A | Avenu | .e | | | | SO | \mathbf{IL} | BORI | NG NUMBER B - 6 | | } |
| ٦ | Portlan | d, Oreg | on | | | | | | | | | | |
| | (503) 79 | 96-0717 | | | | HAI L | OGGEI | ₹: | | | Jeff W. Doss | DRILL | DRILL |
| | PROJE | CT: | | | | SAMP | LING N | ÆTE | IOE | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| ٦ | Brix Ma | aritime | Comp | any | i | | LING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| | | W St. H | - | • | | <u> </u> | PMENT | | | | Canterra CT-250 | 1420 | 1515 |
| | | d, Oreg | | | | DRILI | | | | | M. Reniker | Date: | Date: |
| | PROJE | | 2289 | | - | | ING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| | E | | | | S | | | | 24 | | BORING DIAMETER: 10-inch | OD | |
| | E S | 田民 | | S | XS] | feet | RY | eet) | Ę | 4: ∽ | CASING DIAMETER: Not App | licable | |
| | ALL | SAMPLE NUMBER | TIME | ADSPA (ppm) | AB ANALYS HCID (ppm) | F. 33 | RECOVERY (%) | DEPTH (feet) | W | STRATA (USCS) | SURFACE ELEVATION: Not Sur | | |
| 5 | 題 | AM | | | ΑŬ | NB/ | ပ္သ ေ | P | E | TR | TOP OF CASING ELEVATION: Not App | . · · | |
| ٩ | ABANDONMENT DETAILS | ΩZ | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RE | DE | GROUNDWATER | ∞ <u> </u> | | | |
| | ₹ | | | | H | | | | ট | | SOIL DESCRIPTION | ON | |
| ļ | | 15-024 | 1445 | 0.0 | TAT A | 3 | 0 | 61 | | SP | SAND - gray, moist. loose, non-plasti graded, slight petroleum odor and sta | c, poorly | |
| | | 15-024 | 1445 | 2.3 | NA | 3 | 100 | 21 | | , Dr | graded, slight petroleum odor and sta | in | |
| | | | | | <u> </u> | | 100 | 22 | | | | | |
| | | | | | | | | | 15/93 | | | | |
| | Chips | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 23 | 4/15 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |
| | | | ļ | ļ | | | | 24 | T | | | | |
| | MINIMI Bentonite | | | | | | | | | | | | i |
| | | | | | | | | 25 | | | Cilty OI AV | _16:- | |
| | | 15-025 | 1456 | 2.2 | NA | 3 | 100 | 26 | | CL | Silty CLAY - gray, wet, firm, medium poorly graded, possible petroleum odo | piastic, r and stain | |
| | | 10-020 | 1 7-400 | 2.2 | 172 | 4 | 100 | | 1 | | - <u>-</u> | | |
| | | | _ | | | | | 27 | | | | | [|
| | | | <u> </u> | ļ. — | | | | 28 | | | | | |
| | | | <u></u> | <u> </u> | | <u> </u> | | 20 | 1 | | | | |
| | | | | | | | | 29 | | | | | |
| | ļ | | | ļ | | | | 30 | | | Boring terminated at 25.0 feet - 4/15/ Sampled to 26.5 feet | 93 | ľ |
| j | | | <u> </u> | <u>'</u> | <u> </u> | 1 | <u> </u> | 00 | 1 | • | Boring abandoned with 3/4-inch Bent | onite Chips - | 4/15/93 |
| | | | | | | | | 31 | | | Materials: | | |
| | | | | | | | | | | | Materials: 12 bags 3/4-inch Bentonite Chips | | |
| _ | ŀ | | | <u> </u> | - | | <u> </u> | 32 | 1 | | , | | ł |
| | Ì | | | | | | | 33 | | , | | | |
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| | | | | | | | | 34 | | | | | ì |
| | | | | | | ļ | | 35 | 1 | | | | |
| - | | | <u> </u> | <u> </u> | | | | | 1 | | | • | |
| | | | | | | | | 36 | | | | | |
| | | | - | <u> </u> | | | | 37 | | | | | |
| | | | | - | | | <u> </u> | 31 | 1 | | | | |
| ì | | | | | <u>L</u> | Ľ | | 38 | | | | | |
| Ŋ | | | | | | | | |] | } | | | |
| | | | | | | | | 39 | - | | | | |
| | j | | | | <u> </u> | | - | 40 | | | | | |
| ı | | | | <u> </u> | | <u>- </u> | 1 | | | L | <u> </u> | _· | |

| | W Sixth | | | INC. | SOIL BORING NUMBER B - 7 | | | | | | | | | | |
|-------------|--|----------|--|----------|--|--|----------|------------|----------|---|--|------------|--|--|--|
| | id, Orego | | | | | | 50 | فساله عالد | DO10 | | | | | | |
| | iu, Oregi 96-0717 | 711 | | | LIATT | OGGEF | ··· | | | Jeff W. Doss | DRILL | DRILL | | | |
| PROJE | | | | | | LING N | | 101 | <u> </u> | 2 5/8-inch OD Split Spoon | START | FINISH | | | |
| : [| aritime (| Comp | 00.77 | | | LING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | | |
| I. | W St. H | _ | - | | | | | | : | Canterra CT-250 | 11me: 1530 | 900 | | | |
| | | | road | | | PMENT | TII | E. | ···· | | Date: | Date: | | | |
| PROJE | id, Orego | 2289 | | | DRILI | ING C | ONT | RAG | CTOR: | M. Reniker Geo-Tech Explorations, Inc. | 15-Apr-93 | 16-Apr-93 | | | |
| | 1 | 2200 | | ro | | 12100 | 0 | <u> </u> | J1040. | BORING DIAMETER: 10-inch OD | | 10-11pt-50 | | | |
| E | F-1 02 | | CE | 13. (E | eet) | ₹ | et) | E | | CASING DIAMETER: Not Applica | | | | | |
| MA | ABANDONMENT DETAILS SAMPLE NUMBER TIME (ppm) LAB ANALYSIS TPH-G (ppm) SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER | | | | | | | | XT.A | SURFACE ELEVATION: Not Survey | | | | | |
| | A M | TIN | G G | P. C. | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) ROUNDWATER STRATA (USCS) | | | | | TOP OF CASING ELEVATION: Not Applica | ·· · · · · · · · · · · · · · · · · · · | | | | |
| MA PA | \\ \oldsymbol{z} \oldsymbol{\oldsymbol{Z}}{\oldsymbol{Z}} | - ! | 1E/ | 9 2 | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER STRATA (USCS) | | | | | • | | | | | |
| | | | 1 | 17. | 1 1 1 1 | | | | | SOIL DESCRIPTION | | | | | |
| Concrete: | | | | <u> </u> | | | 1 | | Asphalt | Asphalt | | | | | |
| Concrete: | | | | | | <u> </u> | 1 | | | Silty GRAVEL with some Sand - brown, moist, medium | | | | | |
| 田 さま | | | | | | | 2 | | GP | dense, non-plastic, slightly graded, no pet | noist, medi roleum odo | r or | | | |
| | | | | | | | , | | | stain | | | | | |
| | | | ! | <u> </u> | | <u>:</u> | 3 | ł | | | | | | | |
| | | | | <u> </u> | | | 4 | | | | | Ì | | | |
| | | | | | 4 | | | | | | | | | | |
| | | | | 1 | 5 | 0 | 5 | } | | SAND - gray, moist, medium dense, non-plastic, poorly | | | | | |
| | 15-026 | 1535 | 7.9 | NA | 6 | 100 | 6 | | SP | graded, no petroleum odor or stain | plastic, poo | rly | | | |
| | | | | | 5 | 100 | | | | | | Ì | | | |
| | | | | | | | 7 | 1 | | | | ł | | | |
| | | | | | <u></u> | | 8 | | | | | | | | |
| | | | | ļ — | <u> </u> | | | 1 | | | | | | | |
| | | | | | | | 9 | 1 | | | | 1 | | | |
| Chips | | | | <u> </u> | | | 10 | | | | | | | | |
| | | | <u> </u> | | 12 | 1 0 | <u> </u> | | | SAND - as above, dense, petroleum odor a | and stoin | | | | |
| Bentonite | 15-027 | 1543 | 53 | 270 | 20 | 80 | 11 | | SP | BAND - as above, defise, petroleum odor s | illa stanı | | | | |
| | | | | | 18 | 100 | ,, | | | | | | | | |
| | | | <u>!</u> | [| | | 12 | 1 | | | | Ī | | | |
| | | | _ | - | | | 13 | | | | | | | | |
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| | | | | <u> </u> | <u> </u> | <u> </u> | 14 | | | | | | | | |
| | | | | <u> </u> | | | 15 | | | | | | | | |
| | | | <u>′</u> | | 7 | 0 | <u> </u> | 1 | SP | SAND - as above, petroleum odor and sta | in | ł | | | |
| | 15-028 | 1550 | 755 | 2,000 | | 100 | 16 | | | | | | | | |
| | } | | | · · | 11_ | 100 | 1,7 | | | | | | | | |
| | } | <u> </u> | <u> </u> | | <u> </u> | <u> </u> | 17 | 1 | | | | ĺ | | | |
| | | | | | - | | 18 | | | | | | | | |
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| | 3 | | | | | | 19 | 1 | | | | | | | |
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| HAHN | & ASS | OCIA | TES, | INC. | <u> </u> | | | | | | | | | |
|--|------------------|-------------|--------------------|-----------------------------|-------------------------|--|--------------|---------------|--|--|-------------|-----------|--|--|
| 434 NW | | | | | | | SO | \mathbf{IL} | BORI | NG NUMBER B - 7 | | ł | | |
| Portlan | d, Orego | n | | | Ĺ | | | | | | | | | |
| (503) 79 | 6-0717 | | | | HAI L | OGGEI | ર: | | | Jeff W. Doss | DRILL | DRILL | | |
| PROJE | CT: | | | | SAMP | LING N | ÆTI | IOI |): | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| Brix Ma | ritime (| Compa | any | | DRILI | JING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 N | W St. H | elens : | Road | | EQUII | PMENT | TYI | E | | Canterra CT-250 | 1530 | 900 | | |
| Portlan | d, Orego | on | | | DRILI | ÆR: | | | | M. Reniker | Date: | Date: | | |
| PROJE | CT #: | 2289 | | | DRILI | ING C | ONT | RAC | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 16-Apr-93 | | |
| 包 | | l | 囝 | SIS | ₽ | <u> </u> | (1 | ER | | BORING DIAMETER: 10-inch OD | | | | |
| E SE | SAMPLE NUMBER | 63 | HEADSPACE (ppm) | LAB ANALYSIS TPH-G (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | F.A. | CASING DIAMETER: Not Applica | ble | | | |
| N S S | MB | TIME | ADSPA (ppm) | NA G | SPT s/0.5 | (%) | H. | IDW | RAJ SCS | SURFACE ELEVATION: Not Survey | ed | | | |
| | SAI | I | Ā | 3 A. | S Mo |) 교 | ΕΡΊ | ZD. | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | ble | | | |
| ABANDONMENT DETAILS | | | H | [A] | (ই | 22 | | GRC | | SOIL DESCRIPTION | | | | |
| | 3 80 | | | | | | | | | | nlestic | | | |
| | 15-029 | 1555 | 183 | 13 | 3 | 100 | 21 | | SP | SAND - gray, moist, medium dense, non- poorly graded, slight petroleum odor and | stain | | | |
| | | | | | 5 | 100 | 22 | 8 | mm | | | | | |
| | ; | | <u> </u> | | | | 15/93 | CL | Silty CLAY - gray, wet, stiff, medium pla poorly graded, possible petroleum odor ar | stic, nd stain | ĺ | | | |
| Chips | | | | | | | 23 | 4 | | | | ł | | |
| 1 | | | | | | | 24 | V | | | | | | |
| Minimini Bentonite | | | | | | | - | | | | | | | |
| Ø a Ø. | | | | <u> </u> |) 3 |) 1 0 | 25 | | | Silty CLAY - as above, no petroleum odor | and atain | | | |
| | 15-030 | 1605 | NS | NA | 5 | 0 | 26 | | CL | Sitty CLAI - as above, no petroleum odor | and Stain | 1 | | |
| | | | | | 6 | 100 | | | | | | ĺ | | |
| , | | | <u> </u> | | <u> </u> | <u> </u> | 27 | | | | | ł | | |
| [] | _ | | | | | | 28 | | | | | 1 | | |
| | | | | | | | | | | | | | | |
| | <u> </u> | | <u> </u> | <u> </u> | 1 | <u> </u> | 29 | | | Boring terminated at 25.0 feet - 4/15/93 | | | | |
| 'l t | | | | | | | 30 | | | Sampled to 26.5 feet Boring abandoned with 3/4-inch Bentonit | te Chine 4 | /16/93 | | |
| | | | 1 | | | | 0.1 | | | Doring abundance with 0/4-men benom | c Omps - 4 | 10/30 | | |
| | | ~ | <u> </u> | - | <u> </u> | <u> </u> | 31 | | | Materials: | | 1 | | |
|] [| | | | | | | 32 | | | 15 bags 3/4-inch Bentonite Chips | | ł | | |
| | | | | | <u> </u> | <u> </u> | 33 | | | | | } | | |
| ' [| | | <u> </u> | | | <u>. </u> | 33 | | | , | | j | | |
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| i j | | | <u> </u> | 1 | | | 0.0 | | | | | İ | | |
| | | | | | | | 36 | | | | | 1 | | |
| ' [| | | ļ . <u> </u> | | - | | 37 | | | | | | | |
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| ` | | | <u> </u> | - | | | 39 | | | | | | | |
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| 434 NW | IAHN & ASSOCIATES, INC 34 NW Sixth Avenue Portland, Oregon 503) 796-0717 | | | | | | so | IL | BORI | NG NUMBER B-8 | | | | |
|--------------------------|--|--|--|--|-------------|--------------|---------------|-------------|------------------|---|-----------------|-------------|--|--|
| | _ | | | | HAI T. | OGGEI | - | | | Guy H. Tanz | DRILL | DRILL | | |
| PROJE | | | ~ - | | | LING I | | IOI |): | 1 5/8-inch Split Spoon | START | FINISH | | |
| Brix Ma | | Сотр | anv | | | LING M | | | | 2-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 N | | | | | | PMENT | | | | 2-inch ID Minuteman | 1830 | 1930 | | |
| Portlan | | | | | DRILI | | | | | R. Crisman | Date: | Date: | | |
| PROJE | | 2289 | | | DRILI | ING C | ONT | RA | CTOR: | Crisman Drilling | 15-Apr-93 | 15-Арт-93 | | |
| Ŀ | | | 53 | <u>8</u> | 3 | | | ä | | BORING DIAMETER: 5-inch O | D | | | |
| Ęς | 田田 | | ACE | XS. | feet | E E | DEPTH (feet) | ATE | A | CASING DIAMETER: Not App | icable | | | |
| NA. | ABANDONMENT DETAILS SAMPLE NUMBER TIME (ppm) LAB ANALYSIS (ppm) SPT (ppm) SPT (blows/0.5 feet) SAMPLE INTERVAL | | | | | | | DW | STRATA (USCS) | SURFACE ELEVATION: Not Surv | eyed | | | |
| ĎE I | SAN TUT | H | Į₫ <u>ē</u> | A G | X X | ATE | H | 5 | STE COS | TOP OF CASING ELEVATION: Not Surveyed | | | | |
| BA | .01 24 | | 田 | IAB | (blo | 924 | Ä | GROUNDWATER | | | | | | |
| 111.3111 | | | 1 | | | | | | Concrete | SOIL DESCRIPTIO | 11 | | | |
| | | | | | | | 1 | | | Odificate | | | | |
| #### | | | | | | | | | | | | | | |
| Bentonite Chips Concrete | |] | <u> </u> | <u> </u> | 1 | <u> </u> | 2 | | GP 8 | Silty GRAVEL with some Sand - Brow | n moist loos | e non- | | |
| e | | | | | | <u> </u> | 3 | | | plastic, poorly graded, no petroleum of (concrete fill) | lor or stain | , 11011 | | |
| [[gill | | | | | | | | ĺ | | (concrete III) | | | | |
| Ben | | <u> </u> | <u> </u> | <u> </u> | | | 4 | | | | | | | |
| 1111111111 | | - | | | | | 5 | | <u> </u> | | | | | |
| | | | | | | | | | | Boring shandoned due to sugar refuse | l - concrete fi | ll was | | |
| | | <u> </u> | 1 | <u> </u> | | | 6 | | | Boring abandoned due to auger refuse observed in sand to 4.5 feet bgs | 001101 000 11 | 21 ((4) | | |
| | | | | ļ | | | 7 | | | Boring terminated at 4.5 feet - 4/15/93 | | 4 (4 = /0.0 | | |
| | | | | | | | |] | | Boring abandoned with 3/4-inch Bent | nite Chips - | 4/15/93 | | |
| | | [| 1 | | | | 1 8 | | | Materials: | | | | |
| | | <u> </u> | <u> </u> | | | | 9 | | | 3/4 bags 3/4-inch Bentonite Chips | | | | |
| | | | <u> </u> | 1 | | | 10 | ļ | | | | | | |
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Updated: 6/23/93 JWD

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|-----|--|---------------------------------------|-------------|--|----------------------------|--|--|---|-------------|------------------|---|---------------------------|------------|--|--|
| _] | HAHN | & ASS | OCIA | TES, | INC. | | | | | | | | | | |
| | 434 NW | Sixth A | Avenu | е | | | | SO | IL | BORI | NG NUMBER B - 9 | | 1 | | |
| 1 | Portlan | d, Oreg | on | | ļ | | | _ | | | | | | | |
| | (503) 79 | 96-0717 | | | | HAI L | OGGEF | <u>}:</u> | | | Jeff W. Doss | DRILL | DRILL | | |
| ľ | PROJE | CT: | | | | SAMP | LING N | ÆTI | IOI | D: | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| ٦ | Brix Ma | aritime | Comp | any | | DRILI | JING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| | 9030 N | W St. H | elens i | Road | | EQUI | PMENT | TYI | E | | Canterra CT-250 | 942 | 1035 | | |
| I | Portlan | d, Oreg | on | | | DRILL | | | | | M. Reniker | Date: | Date: | | |
| | PROJE | | 2289 | | | DRILI | ING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 | | |
| أ | E | | | | S | | | | 124 | | BORING DIAMETER: 10-inch OD |) | | | |
| | ABANDONMENT DETAILS | 뜨ద | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT. (blows/0.5 feet) | RY | DEPTH (feet) | GROUNDWATER | 4. | CASING DIAMETER: Not Application | able | | | |
| | A PASS | PL BE | TIME | ADSPA (ppm) | A P | SPT. 's/0.5 | OVE (%) | J) E | W. | AT. CS. | SURFACE ELEVATION: Not Survey | | | | |
| | OF I | SAMPLE NUMBER | TII | \$ 3 | AB ANALYSI HCID (ppm) | SI Ws/(| RECOVERY (%) | P. | S | STRATA (USCS) | TOP OF CASING ELEVATION: Not Application | | | | |
| 4 | BAN | ωZ | | HE | AB HC | old | RE | DE | BOI | ω _. | | | | | |
| إ | ` . | | | <u> </u> | l'i | | | | C | | SOIL DESCRIPTION | | | | |
| ļ | 開業翻 | | | | <u> </u> | <u> </u> | | , | | Asphelt | Asphalt | | | | |
| • | | | | | | | | | | | OHA- ODATET | | | | |
| ı | ူပုံ # | | | | | | | 2 | | g GP | Silty GRAVEL with some Sand - brown, r dense, non-plastic, slightly graded, no per | noist, medi roleum odo | um r or | | |
| | | | | | | | | | | | stain | | | | |
| | | | | <u> </u> | <u> </u> | - | <u> </u> | 3 | | | | | j | | |
| | | | | | | | | 4 | | | | | | | |
| J | | | | | | | | | | | | | | | |
| ł | | | | | <u> </u> |] | | 5 | | | SANTO brown major do ao man Jarkin mandad | | | | |
| | | 16-001 | 954 | 6.2 | NA | 8 | 40 | 6 | | SP | SAND - brown, moist, dense, non-plastic, poorly graded, no petroleum odor or stain | | | | |
| | | 10-001 | 254 | 0.2 | IVA | 19 | 100 | | | | ino positionam outsi of Staffi | | | | |
| _ | | | | | | | | 7 | | | | | ļ | | |
| | Bentonite Chips | · · · · · · · · · · · · · · · · · · · | | | | - | | 8 | | | | | j | | |
| | # to # | | | <u> </u> | 1 | 1 | <u> </u> | 0 | } | | | | ! | | |
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| | linill | | | | | <u> </u> | | 1. |] | | | | | | |
| • | | | | <u>i</u> | <u> </u> | 13 | 20 |] <u>10</u> | 1 | | g.,,,, | | , | | |
| ı | | 16-002 | 1004 | 4.8 | NA | 17 | 100 | 11 | | SP | SAND - as above, no petroleum odor or s | tain | | | |
| | | | | | | 20 | 100 | j | 1 | | | | | | |
| Ì | | ļ | | | | ļ | | 12 | | | | | | | |
| l | | | | | | | | 13 | | | | | | | |
| | | | <u> </u> | | | | | 1 | 1 | | | | j | | |
| | | | | | | | | 14 |] | | | | | | |
| ۱ | | | | | | ļ | <u> </u> | 7.0 | | | | | ţ | | |
| ۱ ا | | | 12 | 100 | 15 | 1 | | . SAND - as above, no petroleum odor or s | tain | | | | | | |
| . [| | 16-003 | 1012 | 6.7 | NA | 12 | 100 | 16 | | SP | . DALID - as above, no penoteum outer or s | UGALLI | | | |
| | | | | | | 1.3 | 100 | | 1 | | | | | | |
| ا ا | Chips | | 1 | | | <u> </u> | ļ | 17 |] | | | | | | |
| , J | # \$ # # # # # # # # # # # # # # # # # # | | <u> </u> | | | | | 18 | | | | | | | |
| ١١ | tonite | | <u></u> | | - | | | 10 | 1 | | | | | | |
| 1 | | | | | | | | 19 | | | | | | | |
| IJ | | | | | | | | | | | | | İ | | |
| j | <u>IIIIIIII</u> | <u> </u> | <u> </u> | 1 | <u> </u> | <u>!</u> | <u> </u> | 20 | <u></u> | <u> </u> | - | | | | |

| HAHN & ASSOCIATES, | INC. | | aoi | r Tr | DANT | NO MUMBER D | | Í | | |
|--|--|--|--------------|-------------|--------------------------|--|-----------|-----------|--|--|
| 434 NW Sixth Avenue | 1 | | SUI | LL | ROKI | NG NUMBER B - 9 | | | | |
| Portland, Oregon | | - | | | | | 1 | | | |
| (503) 796-0717 | | IAI LOGGER | | | | Jeff W. Doss | DRILL | DRILL | | |
| PROJECT: | S | AMPLING M | ŒTH | IOI |) <u>:</u> | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| Brix Maritime Company | D | RILLING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 NW St. Helens Road | E | QUIPMENT | 'TYP | E | | Canterra CT-250 | 942 | 1035 | | |
| Portland, Oregon | | RILLER: | | | | M. Reniker | Date: | Date: | | |
| PROJECT#: 2289 | D | RILLING C | TMO | RA(| CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 | | |
| E E | Si (| æ L | | 띮 | | BORING DIAMETER: 10-inch OF |) | | | |
| BANDONMEN DETAILS SAMPLE NUMBER TIME HEADSPACE (ppm) | ALYSI (ppm) | SF1 Slows/0.5 feet RECOVERY (%) | DEPTH (feet) | M | A' (6 | CASING DIAMETER: Not Applic | able | | | |
| ADSPA | D (p | 3.0.5 (%) | H) | Ã | RAT SCS | SURFACE ELEVATION: Not Survey | red | | | |
| ANDONME DETAILS SAMPLE NUMBER TIME EADSPAC (ppm) | AB ANAHCID | | T | 3 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applic | able | | | |
| ABANDONMENT DETAILS SAMPLE NUMBER TIME HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPI (blows/0.5 feet) RECOVERY (%) | E | GROUNDWATER | 3 2 | | <u></u> | | | |
| | | 9 20 | | ٦ | ومعدود والمراجع والمراجع | SOIL DESCRIPTION | | | | |
| 16-004 1022 4.7 | ND | 8 100 | 21 | | SP | SAND - brown, moist to wet, dense, non- poorly graded, no petrloeum odor or stair | plastic, | | | |
| | | 8 100 | | | | poorly graded, no petrloeum odor or stair | ı İ | | | |
| | | | 22 | | | | | | | |
| | | | 23 | | | | | | | |
| | | | | | | | | ľ | | |
| | | | 24 | | | Boring terminated at 20.0 feet - 4/16/93 | | | | |
| / | <u> </u> | - | 25 | | | Sampled to 21.5 feet | 4- Chi 4 | /1.0/00 | | |
| | 1 | | 20 | | | Boring abandoned with 3/4-inch Bentonite Chips - 4/ | | | | |
| | | | 26 | - 1 | | Materials: | | | | |
| | | | | | | 10 bags 3/4-inch Bentonite Chips | | | | |
| | 1 | | 27 | | | | | | | |
| | | | 28 | | | | | | | |
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| | | | 29 | | | | | , | | |
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| <u></u> | 0.400 | 0.07 | mr. | DIC | | | | | | | | | | |
|------------------------|------------------------------|--|---------------|--------------|---|--|------------|-----|-------------------------|--|-------------|-----------|--|--|
| 1 1 | & ASS | | | INC. | | | e e | TT | יתחמ | NG NUMBER B - 10 | | | | |
| | V Sixth | | e | |) | | 50 | ıLı | DUK | NG NUMBER B - 10 | | | | |
| 1 | d, Orego | n | | | - | | | | | | | | | |
| ! | 96-0717 | | | | | OGGEI | | | | Jeff W. Doss | DRILL | DRILL | | |
| PROJE | | | | | | LING N | | | | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| | aritime ' | _ | - | | DRILI | LING M | ETH | IOD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 N | W St. H | elens : | Road | | EQUI | PMENT | TY | PE_ | | Canterra CT-250 | 1048 | 1138 | | |
| | d, Orego | | | | DRILI | | | | | M. Reniker | Date: | Date: | | |
| PROJE | CT #: | 2289 | | , | DRILI | ING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 | | |
| Ę | | , | 函 | Sis | ₽ | | E | ER | } | BORING DIAMETER: 10-inch OD | | | | |
| ABANDONMENT DETAILS | E E | F-5 | AC. | y (md | fee | SE. | feed | 'AT | 8.8 | CASING DIAMETER: Not Applica | ble | | | |
| N N N | SAMPLE NUMBER | TIME TIME (ppm) (ppm) (ADD (ppm) (Blows/0.5 feet) (Blows/0.5 feet) (COVERY (%) (COVERY (%) | | | | | | | SCS | SURFACE ELEVATION: Not Survey | ed | | | |
| | SAN | T | A G | E E | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER STRATA (TISCS) | | | | | TOP OF CASING ELEVATION: Not Applicable | | | | |
| BA B | ~ 4 | | H | HA H | RE RE CROI | | | | | SOIL DESCRIPTION | | | | |
| | • | - | <u> </u> | | | | | μ. | Annal I | SOIL DESCRIPTION Asphalt | | | | |
| 田島田 | | | | | | <u> </u> | 1 | | Asphalt | a Asphait | | | | |
| Concrete: | | | | | | | | 1 | | Silty GRAVEL with some Sand - brown/gray, moist, | | | | |
| 無点無 | | | 1 | | ! | ! | 2 | | GP) | Silty GRAVEL with some Sand - brown/gr medium dense, non-plastic, slightly grade petroleum odor or stain | d, no | 1 | | |
| | | | | ļ | | <u> </u> | 3 | | | petroleum odor or stain | | | | |
| | | | | | | | | 1 | | | | • | | |
| | | | | | | | 4 | | | | | | | |
| | | | | | | | 5 | | | | | | | |
| | | | J | <u> </u> | 11 | 0 | Ð | } | | SAND - brown/gray, moist, medium dense, non-plastic, | | | | |
| | 16-005 | 1055 | NS | NA | 9 | 0 | 6 | | SP | SAND - brown/gray, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | | |
| | | | | | 9 | 50 | | 1 | | trans Branad no bon ground and at gamin | | | | |
| | | | | <u> </u> | | | 7 | | Karana Gasaro | | | | | |
| | | | | | | - | 8 | | | | | | | |
| | | | | | | | | 1 | | | | | | |
| | | | | | | | 9 | | | | | | | |
| Chips | | | | - | | | 16 | | | | | | | |
| | | | | <u>!</u> | 10 | 20 | , <u>"</u> | 1 | Maria Maria | SAND - as above, brown, no petroleum od | on on stal- | | | |
| Bentonite | 16-006 | 1102 | 4.5 | NA | 13 | 100 | 11 |] | SP | האמים - as above, brown, no petroleum od | or or stain | | | |
| Beg | | | | | 14 | 100 | |] | | | | | | |
| | | | | | | | 12 | 4 | | | | ĺ | | |
| | , | | | | - | - - | 13 | | | | | 1 | | |
| | | | | | | | | | [7/4/8/6] [9/1/8/7/8 | | | | | |
| | | | | | | | 14 | | | | | | | |
| | | | | | | | | | | | | | | |
| 11 20 | | | | | | | | | SP | SAND - as above, no petroleum odor or st | oin | | | |
| | 16-007 1110 4.9 NA 13 100 16 | | | | | | | | | SAND - as above, no petroleum odor or st | alli | | | |
| | | | | | 14 | 100 | | 1 | | | | | | |
| | | | | | | | 17 | 1 | | | | | | |
| | | | <u> </u> | | <u> </u> | <u> </u> | 18 | | | | | | | |
| | | - | <u>!</u>] | - | <u> </u> | - | 10 | 1 | | | | | | |
| Bentonite | | | | | | | 19 |] | | | | | | |
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| | | | | | | | 20 | | EXTENSE. | | | 1 | | |

| HAHN | & ASS | OCIA | TES, I | INC. | <u> </u> | | | | | | _ | | | |
|--|------------------|-------------|--------------------|--|--|--|--------------|-------------|------------------|---|---------------|---------------|--|--|
| 434 NW | | | | |] | | SO | IL | BORI | NG NUMBER B - 10 | | Ī | | |
| Portlan | d, Orego | on | | | Ĺ | | | | | | | | | |
| (503) 79 | 96-0717 | | | | HAI L | OGGEI | ₹: | | | Jeff W. Doss | DRILL | DRILL | | |
| PROJE | CT: | | | | SAMP | LING N | METE | IOI | D: | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| Brix Ma | aritime | Comp | any | | DRILI | LING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 N | | _ | | | EQUI | PMENT | ' TYE | E | | Canterra CT-250 | 1048 | 1138 | | |
| Portlan | d, Oreg | on | | | DRILI | LER: | | | | M. Reniker | Date: | Date: | | |
| PROJE | | 2289 | | | DRILI | ING C | ONT | RAG | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 | | |
| Ę | | | F=1 | SI | 3 | | | 3.18 | | BORING DIAMETER: 10-inch OD | | | | |
| E S | 田田 | | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | ATI | 4 : | CASING DIAMETER: Not Applica | able | | | |
| | SAMPLE NUMBER | TIME | ADSPA (ppm) | A G | SPT s/0.5 | (%) |) H | DW | STRATA (USCS) | SURFACE ELEVATION: Not Survey | ed | | | |
| 10000000000000000000000000000000000000 | SAN TUN | TI. | A P | A E | S /S | ည္က | PI | Š | | TOP OF CASING ELEVATION: Not Applica | able | | | |
| ABANDONMENT DETAILS | V2 Z4 | | HE | LAB ANALYSIS HCID (ppm) | ĕ | R. | Ħ. | GROUNDWATER | - | SOIL DESCRIPTION | | | | |
| | | - | | <u> </u> | 10 | 50 | | | Same and Same | SOIL DESCRIPTION | | j | | |
| | 16-008 | 1118 | 5.1 | ND | 13 | 100 | 21 | | SP | SAND - brown/gray, moist to wet, medium non-plastic, slightly graded, no petroleum | n dense, | | | |
| | 11 10 | | | | | | | | | non-plastic, slightly graded, no petroleun stain | odor or | i | | |
| | | <u></u> - | | <u> </u> | <u> </u> | <u> </u> | 22 | | | | | } | | |
| 5 | | | | | | | 23 | | · | | | | | |
| . | | | | | | | | | | | | | | |
| | | | l | | | 1 | 24 | | ; | Boring terminated at 20.0 feet - 4/16/93 | | | | |
| "] | i | | | | | - | 25 | | | Sampled to 21.5 feet Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /16/93 | | |
| | | | | | | | | | | - | - | | | |
| | | | <u> </u> | <u> </u> | 1 | <u> </u> | 26 | | , | Materials: 11 bags 3/4-inch Bentonite Chips | | İ | | |
| | | | | | | - | 27 | | | 11 bags of 4-men Dentonitie Chips | | | | |
| | | | | | | | | | | | | | | |
| | | | <u> </u> | | 1 | <u> </u> | 28 | | | | | | | |
| | | | | <u> </u> | - | | 29 | | | | | | | |
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|] | | <u> </u> | i | <u> </u> | 1 | <u> </u> | 30 | | | | | · · | | |
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|) [| | | | | ļ | | - 00 | | | | | 1 | | |
| 1 1 | | | i I | | | | 32 | | | | | | | |
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| | <u> </u> | | 1 | | 1 | ļ | 34 | | | | | | | |
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| 1 | | | | | 1 | - | 36 | | | | | | | |
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| | | | | | | | | | | | | | | |
| | | | | | | } | 38 |] | | | | | | |
| ' | | | | | <u> </u> | _ | 39 | | | | | ĺ | | |
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| | | | <u> </u> | <u> </u> | 1 | <u> </u> | 40 | | | | | | | |

| 434 NV | & ASSO V Sixth | Avenu | NC. | SOIL BORING NUMBER B - 11 | | | | | | | | | | |
|---|-------------------|------------|--------------------|----------------------------|-------------------------|--|--------------|---------------------------------------|--------------------------------|--|------------------|--------------------|--|--|
| 1 | id, Orego | on | | | TATT | OGGEI | | | | Jeff W. Doss | DRILL | DRILL | | |
| | 96-0717 | | | , | | LING N | | | <u> </u> | | 1 . | FINISH | | |
| PROJE | | O | | | | | | | | 2 5/8-inch OD Split Spoon | START | | | |
| I. | aritime | | | | | JING M | | | <u> </u> | 4 1/4-inch ID Hollow Stem Auger | Time: 1150 | Time: 1245 | | |
| | W St. H | | Koad | | _ - | PMENT | 111 | E | | Canterra CT-250 | | Date: | | |
| Portlar | id, Orego | on 2289 | | - | DRILI | JER: LING C | יויוגר | DAC | ייייסיי. | M. Reniker Geo-Tech Explorations, Inc. | Date: 16-Apr-93 | Date: 16-Apr-93 | | |
| | /CI #. | 2200 | | | DIGID | mid C | | 1 | JIOA. | | | 10-Apr-93 | | |
| ABANDONMENT DETAILS | دم | | 뜅 | LAB ANALYSIS HCID (ppm) | (f) | 2. | et) | GROUNDWATER | | | | | | |
| I SH | SAMPLE NUMBER | 臼 | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | WA | STRATA (USCS) | CASING DIAMETER: Not Applic | | | | |
| ■ OF | ME | TIME | ADSPA (ppm) | ŽÃ | SPT 8/0.5 | ζοχ (%) | TH | ND | 'RA JSC | SURFACE ELEVATION: Not Survey | | | | |
| A Pin | SA | T. | EA | B A | low | SEC. | EP | OU | 3.1 (1 | TOP OF CASING ELEVATION: Not Applic | : Not Applicable | | | |
| | | | H | Y. | ව | | а | GR | | SOIL DESCRIPTION | | | | |
| # £ # | | | | | | | | | Asphalt | Asphalt | | | | |
| # in the state of | | | | | | | | | | Silty GRAVEL with some Sand - brown/g medium dense, non-plastic, slightly grade | ray, moist, | | | |
| 悪の根 | <u> </u> | | <u> </u> | <u> </u> | <u> </u> | 1 | 2 | | GP & | medium dense, non-plastic, slightly grade petroleum odor or stain | ed, no | | | |
| | | | | <u> </u> | | | 3 | | | | | ł | | |
| | | | | | | | | | | | | | | |
| | | | | | <u> </u> | <u> </u> | . 4 | | XXXXX | | | Į | | |
| | | | | | | | 5 | | | | | | | |
| | | | | | 1 | 100 | | 1 | SP | SAND - gray, moist, medium dense, non-plastic, poorly | | | | |
| | 16-009 | 1200 | 5.1 | NA | 9 | 0 | 6 | | | graded, no petroleum odor or stain | | | | |
| | | | | | 9 | 20 | 7 |] | | | | | | |
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| Chips | | | | <u> </u> | <u> </u> | <u> </u> | | | | | | - | | |
| | | | | | | | 10 | | | | | ſ | | |
| | 16-010 | 1907 | 6.2 | NA | 10 | 100 | 11 | | SP | SAND - as above, gray, no petroleum odo | r or stain | | | |
| Bentoni | 10-010 | 1201 | V.E_ | 1477 | 10 | 100 | -1 | | (3), (7), (4) (3), (7), (4) | | | | | |
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| | | | | <u> </u> | | <u> </u> | 13 | | | | | | | |
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| | | | | ļ | | | | 1 | | | | Ì | | |
| | Î | | | <u> </u> | 8 | 0 | 15 | | | SAND - as above, possible petroleum odo | ur and | Ì | | |
| | 16-011 | 1213 | 5.7 | ND | 8 | 20 | 16 | | SP | stain | n anu | | | |
| | | | | | 7 | 100 | | | | | | | | |
| | | | | | <u> </u> | | 17 | | | | | | | |
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| | | | | | <u> </u> | | 20 | | | | | | | |
| | <u>'</u> | | | | | | | | | l an | | | | |

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|-----|------------------------|--|--------------|--|--|--|--|--------------|-------------|------------------|--|--------------|-----------|
| | HAHN | | | - | INC. | | | gO. | TT | ומטת | NG NUMBER B - 11 | | |
| | 434 NW | | | le | | | | SU | | BUKI | NG NUMBER B - 11 | | ļ |
| - 1 | Portlan | - | | | | <u> </u> | | | | | | | |
| | (503) 79 | 6-0717 | | | | HAI L | OGGEI | <u>R:</u> | | | Jeff W. Doss | DRILL | DRILL |
| | PROJE | CT: | | | | SAMP | LING N | ÆTI | IOI | D <u>:</u> | 2 5/8-inch OD Split Spoon | START | FINISH |
| ٦ | Brix Ma | eritime | Comp | any | | DRILI | LING M | ETH | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| ╛ | 9030 N | W St. H | elens | Road | | EQUI | PMENT | TYF | Œ | | Canterra CT-250 | 1150 | 1245 |
| | Portlan | d, Oreg | on | | | DRILI | LER: | | | | M. Reniker | Date: | Date: |
| | PROJE | CT #: | 2289 | | _ | DRILI | JNG C | ONT | RAC | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Арт-93 |
| | Ţ | | | F.31 | S | 3 | | | K. | | BORING DIAMETER: 10-inch OD | | |
| ٩ | E S | 电话 | | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | feel | RY | DEPTH (feet) | ATI | A (| CASING DIAMETER: Not Application | able | |
| ╝ | | SAMPLE NUMBER | TIME | ADSPA (ppm) | Ψ. | F 33 | RECOVERY (%) | H (| M | STRATA (USCS) | SURFACE ELEVATION: Not Survey | ed | |
| | ŠĘ (| \$ 5 ! | II | δĒ | A E | ws/S | | PI | N. | E (C) | TOP OF CASING ELEVATION: Not Applica | able | |
| | ABANDONMENT DETAILS | SAMPLE NUMBER TIME TIME (ppm) LAB ANALYSIS HCID (ppm) SPT (blows/0.5 feet) | | | | | | | GROUNDWATER | 01 - | | | |
| | ~ | | | | 1 | | | | 2 | a ac bra | SOIL DESCRIPTION | | |
| | | 16-012 | 1219 | 4.4 | NA | 6 4 | 100 | 21 | | SP | SAND - gray, moist, medium dense, non- poorly graded, slight petroleum odor an | plastic, | |
| 7 | | 10-012 | 1215 | **.** | INA | 5 | 100 | 21 | | | | | 1 |
| | | | | | | <u></u> | | 22 | | CL | Silty CLAY - gray, moist, stiff, medium p poorly graded, no petroleum odor or stair | iastic, 1 | 1 |
| | | | | | | | ļ | | 4/16/93 | | | | |
| | # [i g | | - | <u> </u> | i | <u> </u> | 1 | 23 | 4/1 | | | | |
| | | | | | | | | 24 | V | | | | |
| | entonit | | | | | | i | | | | | | |
| | | | <u> </u> | <u> </u> | <u> </u> | | | 25 | | | Silty CLAY - as above, wet, no petroleum | adam an | |
| | | 16-013 | 1227 | 4.8 | NA. | 3 | 100 | 26 | | | stain | ouor or | |
| | | |] | | | 4 | 100 | | | | | | |
| | | | | | | | | 27 | | | | | ľ |
| | | | | ļ | | <u> </u> | | 28 | | | | | |
| | | | · | <u> </u> | <u></u> | | | 20 | | | | | |
| | | | | <u> </u> | | | | 29 | | | _ | | |
| | | | | | | | <u> </u> | 30 | | i | Boring terminated at 25.0 feet - 4/16/93 Sampled to 26.5 feet | | |
| 7 | ŀ | | 1 | <u> </u> | <u> </u> | ! | <u> </u> | อบ | | | Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /16/93 |
| | İ | , | | | | | - | 31 | | | <u></u> . | | |
| | ļ | | | | | | |] | | | Materials: 12 bags 3/4-inch Bentonite Chips | | |
| - | - 1 | | | | <u> </u> | <u> </u> | <u> </u> | 32 | } | | | | } |
| | | | | | - | <u> </u> | ļ | 33 | | | | | 1 |
| | | | | <u>'</u> | | | | | 1 | | | | |
| | | | | | | | | 34 | | | | | 1 |
| | | | | | <u> </u> | | | 35 |] . | | | | |
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| _ | } | | | 36 | | | | | | | | | |
| 6 | | | | | | | | | | | | | l |
| | | | | <u> </u> | | 37 | | | | | | | |
| | - | | | | | | | 38 | | | | | ł |
| | | | <u>'</u> | | | | | 33 | 1 | | | | |
| - | | | | | | | | 39 | | } | | | ŀ |
| | | | | <u> </u> | - | - | 40 | | | | | | |
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| HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue | SOIL BOR | NG NUMBER B - 12 | | | | |
|--|--|--|-------------|-----------|--|--|
| Portland, Oregon | | | | [| | |
| (503) 796-0717 | HAI LOGGER: | Jeff W. Doss | DRILL | DRILL | | |
| PROJECT: | SAMPLING METHOD: | 2 5/8-inch OD Split Spoon | START | FINISH | | |
| Brix Maritime Company | DRILLING METHOD: | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | |
| 9030 NW St. Helens Road | EQUIPMENT TYPE | Canterra CT-250 | 1304 | 1345 | | |
| Portland, Oregon | DRILLER: | M. Reniker | Date: | Date: | | |
| PROJECT #: 2289 | DRILLING CONTRACTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 | | |
| E S | G 8 | BORING DIAMETER: 10-inch OI |) | | | |
| BANDONMEN DETAILS SAMPLE NUMBER TIME HEADSPACE (ppm) AB ANALYSI HCID (ppm) | SPT RECOVERY (%) DEPTH (feet) ROUNDWATEI STRATA (USCS) | CASING DIAMETER: Not Application | able | | | |
| ANDONMED DETAILS SAMPLE NUMBER TIME EADSPAC (ppm) B ANALYS | SPT slows/0.5 fee RECOVERY (%) DEPTH (feet ROUNDWATI STRATA (USCS) | SURFACE ELEVATION: Not Survey | red | | | |
| | | TOP OF CASING ELEVATION: Not Applica | able | | | |
| ABANDONMENT DETAILS SAMPLE NUMBER TIME (PPM) LAB ANALYSIS HCID (PPM) | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER STRATA (USCS) | SOIL DESCRIPTION | | | | |
| | Asphalt | SOIL DESCRIPTION Asphalt | | | | |
| 2 Concrete 2 | 1 | Aspnatt | | | | |
| | 2 GP 8 | Silty GRAVEL with some Sand - brown, moist, medium dense, non-plastic, slightly graded, no petroleum odor or | | | | |
| | 2 GP 8 | dense, non-plastic, slightly graded, no pet stain | roleum odo | ror | | |
| | 3 | | | Ī | | |
| | | | | | | |
| | 4 | | | | | |
| | 5 | | | - | | |
| | 4 20 SP | SAND - gray, moist, loose, non-plastic, poorly graded, no petroleum odor or stain | | | | |
| 16-014 1310 4.8 NA | 5 100 6 | | | | | |
| | 7 | | | ł | | |
| | | | | 1 | | |
| | 8 | | | ł | | |
| 2 | | | | ! | | |
| Chips | | | | | | |
| | 10 0 | G1375 | | | | |
| 98 point | 13 100 11 SP | SAND - as above, medium dense, possible odor and stain | e petroleum | 1 | | |
| Ben | 12 100 | | | | | |
| | 12 | | | ŀ | | |
| | 13 | | | | | |
| | | | | Į | | |
| | 14 | | | | | |
| | 15 | | | , | | |
| | 100 | SAND - as above, slight petroleum odor a | and stain | 1 | | |
| 16-016 1325 7.1 ND | 11 100 16 SP | , 5 . | | j | | |
| 2 | 13 100 | | | | | |
| [] | | · | | J | | |
| it it is | 18 | | | | | |
| Bentonite Chips | 10 | | | | | |
| B B | 19 | | | | | |
| | 20 | | | ļ | | |

| НАН | N & ASS | OCIA | TES. | INC. | | | | | | | <u>.</u> | |
|------------------------|---------------|------------|--|----------------------------|--|-----------------|--------------|-------------|---|---|--------------|-----------|
| 1 | W Sixth. | | | | 1 | | SO | IL | BORI | NG NUMBER B - 12 | | [|
| | nd, Oreg | | | | | | | | | | | 1 |
| | 796-0717 | | | | HAI L | OGGEI | | | | Jeff W. Doss | DRILL | DRILL |
| PROJ | | | | | SAMP | LING N | ÆTF | HOI | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| • (| Aaritime | Comp | anv | | | ING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 1 | NW St. H | _ | - | | | PMENT | | | | Canterra CT-250 | 1304 | 1345 |
| | nd, Oreg | | | | DRILI | | | _ | | M. Reniker | Date: | Date: |
| | ECT#: | 2289 | | | · | ING C | ONT | RAC | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 |
| E | | | | S | | | | ,R | | BORING DIAMETER: 10-inch OD | · · · · · · | · |
| ABANDONMENT DETAILS | 田兴 | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RY | DEPTH (feet) | GROUNDWATER | A (| CASING DIAMETER: Not Applica | ıble | |
| | SAMPLE | TIME | ADSPA (ppm) | AB ANALYS HCID (ppm) | SPT s/0.5 | RECOVERY (%) | H (1 | DW. | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| E E | ¥ 5 | TI | ₽ Œ | 48 | S /sw | ည | PT | S | E 5 | TOP OF CASING ELEVATION: Not Applica | | |
| BA. | 0.2 | | 田田 | AB H | 92 | RE | DE | RO | 02 | | ·- <u>-</u> | |
| | 4 | | | | 1 1 | 100 | | <u>ا</u> | | SOIL DESCRIPTION | | |
| | 16-017 | 1333 | 5.3 | NA | 4 | 100 | 21 | | | Silty CLAY - gray/brown, moist to wet, st | iff, non- | l |
| | | | | 8 | 100 | | | | Silty CLAY - gray/brown, moist to wet, st plastic, poorly graded, no hydrocarbon od stain | or or | | |
| ₿ł | | | <u> </u> | | <u> </u> | | 22 | | | | | ļ |
| 5] | | | | | | | 23 | | | | | ļ |
| _ | | | | | | | | | | | | İ |
| | | | <u> </u> | | <u> </u> | | 24 | | | Boring terminated at 20.0 feet - 4/16/93 | | } |
| " | <u> </u> | · <u> </u> | | <u> </u> | | | 25 | | | Boring terminated at 20.0 feet - 4/16/93 Sampled to 21.5 feet Boring abandoned with 3/4-inch Bentonic | te Chips - 4 | /16/93 |
| | | | <u> </u> | | 1 | | | | ! | | | 1 |
| | | <u> </u> | <u> </u> | <u> </u> | ļ | | 26 | | | Materials: 11 bags 3/4-inch Bentonite Chips | | |
| | | | | | | | 27 | | | 11 dags 3/4-men Dentomte Cmps | | l |
| ! | | | | | | | | | | | | Ì |
| • | <u> </u> | | 1 | | | | 28 | | | | | Ì |
| •1 | - | | | | | . —. | 29 | | | | | ſ |
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| 1 | | | <u> </u> | <u> </u> | <u> </u> | | 32 | | | | | |
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| r i | | | | | | | 36 | | | | | İ |
| } | | | | | | | 37 | | | | | i |
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| | | | | 1 | - | | 38 | | | | | |
| ' | <u> </u> | | | <u> </u> | | | 39 | | | | | 1 |
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| <u> </u> | | | | | 1 | | 40 | | | <u> </u> | | |

| HAHN | & ASS | OCIA | TES, | INC. | | | | | | | | | | | |
|------------------------|-----------|-----------|--------------------|--|--|--|--------------|---------------|------------------|---|---------------|-------------------|--|--|--|
| 434 NW | | | | | } | | SO | \mathbf{IL} | BOR | NG NUMBER B-13 | | | | | |
| Portlan | d, Orego | on | | | | | | | | | | | | | |
| (503) 79 | | | | | HAI L | OGGEI | | | <u> </u> | Jeff W. Doss | DRILL | DRILL | | | |
| PROJE | | | **** | | SAMP | LING I | MET! | HOI | D: | 2 1/4-Inch OD Hand Auger | START | FINISH | | | |
| Brix Ma | aritime (| Compa | any | | DRILI | JING M | ETH | (OD | : | 2 1/4-Inch OD Hand Auger | Time: | Time: | | | |
| 9030 N | | - | - | | EQUI | PMENT | וצד י | PΕ | | 2 1/4-Inch OD Hand Auger | 1345 | 1440 | | | |
| Portlan | | | | | DRILI | | | | | Jeff W. Doss | Date: | Date: | | | |
| PROJE | | 2289 | | | | ING C | ONT | RA | CTOR: | Not Applicable | 16-Apr-93 | 16-Apr-93 | | | |
| Ę | _ | | E | SI C | Œ | | | H. | | BORING DIAMETER: 2 1/4 Inches | S | 1 | | | |
| 質点 | 超锐 | | HEADSPACE (ppm) | AB ANALYSI 418.1M (ppm) | SPT (blows/0.5 feet) | E I | DEPTH (feet) | A'TE | 4 ⊖ | CASING DIAMETER: Not Applica | able | | | | |
| N N N | ABH | TIME _ | ADSPA (ppm) | AAL | SPT s/0.5 | 집 |) H | DW | KAT | SURFACE ELEVATION: Not Survey | ed | | | | |
| | SAMPLE | TI | ₽ E | A E | S /S | SAMPLE INTERVAL | FF | S | STRATA (USCS) | TOP OF CASING ELEVATION: Not Survey | ed | | | | |
| ABANDONMENT DETAILS | 01 24 | | H | LAB ANALYSIS 418.1M (ppm) | ी श्री | m #1 | ä | GROUNDWATER | -1 | COM PECCHIPMION | | | | | |
| | | | | | | | <u> </u> | | Asphalt 2 | SOIL DESCRIPTION Asphalt | <u></u> | · | | | |
| Concrete: | | | | | | | 1 | | | Asphait | | İ | | | |
| 用調用 | | | | | | | <u> </u> | 1 | | | | | | | |
| 馬姆 | | | | ļ | | <u> </u> | 2 | | GP | CHARGE ATTELS Description of the land of | 1_4:_ | | | | |
| | | | | | | | 3 | | GP (| Silty GRAVELS - Brown, moist, loose, non-plastic, moderately graded, possible fill | | | | | |
| | | | | <u> </u> | | ļ <u></u> | <u>~</u> | | | | | | | | |
| | | | | | | | 4 | | | | | | | | |
| Bentonite Chips | | | | ļ | | <u> </u> | 5 | | | | | | | | |
| | 16-018 | 1402 | 4.5 | NA. | <u> </u> | <u> </u> | | ĺ | CL | Silty CLAY - gray, moist to wet, stiff, non graded, no petroleum odor or stain, sheer bit | -plastic, po | orly | | | |
| | | | | | | | 6 | | | graded, no petroleum odor or stain, sneer bit | i noticed or | ı auger | | | |
| | | | | | | | 7 | | | | | | | | |
| | | | | | | <u> </u> | | 1 | | | | | | | |
| | 16-019 | 1415 | 6 | NA | | | 8 | | | | | | | | |
| | | | <u> </u> | ļ | ļ | | , | ļ ` | | | | | | | |
| | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 9 | 1 | SM | Silty SAND - gray, moist, loose, non-plas no petroleum odor or stain, sheen still ex | tic, poorly ; | graded, er bit | | | |
| | | | | | <u> </u> | | 10 | | | no positional out of blain, oncon byin on | | 5. D.V | | | |
| | | | | | | | |] | | | | | | | |
| | 16-020 | 1435 | 10.3 | 200 | <u> </u> | <u> </u> | 11 | { | | | | | | | |
| | | | | - | | | 12 | 1 | | . | | | | | |
| | | | | | | | | 1 | | Boring terminated at 11.0 feet - 4/16/93 Sampled to 11.0 feet | | | | | |
| | | | | | <u> </u> | | 13 | | | Boring abandoned with 3/4-inch Benton | ite Chips- | 4/16/93 | | | |
| | | | | - | | | 14 | | | Materiala | | ĺ | | | |
| | | | | | L | | | 1 | | Materials: 3/4 bags 3/4-inch Bentonite Chips | | | | | |
| | | | | | | | 15 | | | _ | | | | | |
| } | | | | | - | | 16 | | | | | | | | |
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| | APPENDIX C | |
| | Laboratory Results and Chain-of-Custody Documentation | |
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| <i>:</i> | | |
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| | | BRIX 001015 |



REVIEWED BY:

RJ

REVIEW DATE:

4.23.93

HYDROCARBON IDENTIFICATION (HCID) BY OREGON DEQ TPH-HCID

2289-930415-003 SAHPLE ID: OAL ID: 25-0127-10934 4/15/93 SAMPLE DATE: MATRIX: SOIL EXTRACTION DATE: 4/22/93 4/22/93 ANALYSIS DATE: HCID: SURR.RECOVERY % 85. ANALYST: RJ

ORTHO-TERPHENYL WAS USED AS THE SURROGATE

NA = NOT ANALYZED

GASOLINE REGION (C6 THRU C10)

DIESEL REGION (C10 THRU C28)

OIL AND BUNKER C REGION (BEYOND C28)

ND = NONE DETECTED (GASOLINE < 20 MG/KG, DIESEL < 50 MG/KG)

HI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007 Phone 503-644-5300 • Fax 503-671-1404



: . .

REVIEWED BY: ___

<u> R5</u>

REVIEW DATE:

4.23-93

HYDROCARBON IDENTIFICATION (HCID) BY DREGON DEQ TPH-HCID

| SAMPLE ID: | 2289-930415-005 | 2289-930415-006 | 2289-930415-010 |
|------------------|-----------------|-----------------|-----------------|
| OAL ID: 25-0127- | 10856 | 10857 | 10858 |
| SAMPLE DATE: | 4/15/93 | 4/15/93 | 4/15/93 |
| MATRIX: | SOIL | SOIL | SOIL |
| EXTRACTION DATE: | 4/21/93 | 4/21/93 | 4/21/93 |
| ANALYSIS DATE: | 4/21/93 | 4/21/93 | 4/21/93 |
| HCID: | ND | ND | ND |
| • | • | • | |
| SURR.RECOVERY % | 82. | 85. | 80. |
| ANALYST: | R.J | R.1 | 9.1 |

ORTHO-TERPHENYL WAS USED AS THE SURROGATE

NA = NOT ANALYZED

GASOLINE REGION (C6 THRU C10)

DIESEL REGION (C10 THRU C28)

OIL AND BUNKER C REGION (BEYOND C28)

ND = NONE DETECTED (GASOLINE < 20 MG/KG, DIESEL < 50 MG/KG)

HI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007

Phone 503-644-5300 • Fax 503-671-1404

11101E 505-044-5500 - 12x 505-07 1-1404

Confidential Business Information

BRIX 001017

BAN GREAT AC CREATE



REVIEWED BY:

RJ

REVIEW DATE:

4.23.93

HYDROCARBON IDENTIFICATION (HCID) BY OREGON DEQ TPH-HCID

| SAMPLE ID: | 2289-930415-011 | 2289-930415-015 | 2289-930415-018 | 2289-930415-020 |
|------------------|-----------------|-----------------|-----------------|-----------------|
| OAL ID: 25-0127- | 10859 | 10860 | 10861 | 10862 |
| SAMPLE DATE: | 4/15/93 | 4/15/93 | 4/15/93 | 4/15/93 |
| MATRIX: | SOIL | SOIL | SOIL | SOIL |
| EXTRACTION DATE: | 4/21/93 | 4/21/93 | 4/21/93 | 4/21/93 |
| ANALYSIS DATE: | 4/21/93 | 4/21/93 | 4/21/93 | 4/21/93 |
| HCID: | ND | ND | ND | ND |
| • | • | • | | • |
| SURR.RECOVERY % | 89. | 68. | 89. | 88. |
| ANALYST: | RJ | RJ | RJ | RJ |

ORTHO-TERPHENYL WAS USED AS THE SURROGATE NA = NOT ANALYZED

GASOLINE REGION (C6 THRU C10) DIESEL REGION (C10 THRU C28)

OIL AND BUNKER C REGION (BEYOND C28)

ND = NONE DETECTED (GASOLINE < 20 Mg/KG, DIESEL < 50 Mg/KG)

MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007

Phone 503-644-5300 • Fax 503-671-1404



HAHN & ASSOCIATES, INC. 434 N.W. 6TH AVE. SUITE 203 PORTLAND, DRE. 97209-3600

796-0717 FAX 227-2209

GUY TANZ

J0B#2289

REVIEWED BY:

5m

REVIEW DATE:

4126/93

HYDROCARBON IDENTIFICATION (HCID) BY OREGON DEQ TPH-HCID

| SAMPLE ID: | 2289-930415-022 | 2289-930415-023 | 2289-930415-027 | 2289-930415-028 |
|------------------|-----------------|-----------------|-----------------|-----------------|
| OAL ID: 25-0127- | 10863 | 10864 | 10865 | 10866 |
| SAMPLE DATE: | 4/15/93 | 4/15/93 | 4/15/93 | 4/15/93 |
| MATRIX: | SOIL | SOIL. | SOIL | SOIL |
| EXTRACTION DATE: | 4/21/93 | 4/21/93 | 4/21/93 | 4/21/93 |
| ANALYSIS DATE: | 4/21/93 | 4/21/93 | 4/21/93 | 4/21/93 |
| HCID: | Ю | · ND | GASOLINE | GASOLINE |
| • | • | • | • | • |
| SURR.RECOVERY % | 89. | 89. | 90. | 90. |
| ANALYST: | RJ | RJ | RJ | RJ |

ORTHO-TERPHENYL WAS USED AS THE SURROGATE

NA = NOT ANALYZED

GASOLINE REGION (C6 THRU C10)

DIESEL REGION (C10 THRU C28)

OIL AND BUNKER C REGION (BEYOND C28)

ND = NONE DETECTED (GASOLINE < 20 MG/KG, DIESEL < 50 MG/KG)

HI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007

Phone 503-644-5300 • Fax 503-671-1404



HAHN & ASSOCIATES, INC.

434 N.W. 6TH AVE.

SUITE 203

PORTLAND, ORE. 97209-3600

GUY TANZ

796-0717 FAX 227-2209

J0B#2289

REVIEWED BY:

SM

REVIEW DATE:

4/26/93

TOTAL PETROLEUM HYDROCARBONS - GASOLINE BY OREGON DEQ TPH-G

| SAMPLE ID: | 2289-930415-022 | 2289-930415-023 | 2289-930415-027 | 2289-930415-028 |
|------------------|-----------------|-----------------|-----------------|-----------------|
| OAL ID: 25-0127- | 10863 | 10864 | 10865 | 10866 |
| SAMPLE DATE: | 4/15/93 | 4/15/93 | 4/15/93 | 4/15/93 |
| MATRIX: | NA | NA | SOIL | SOIL |
| EXTRACTION DATE: | • | • | 4/22/93 | 4/22/93 |
| ANALYSIS DATE: | | • | 4/26/93 | 4/26/93 |
| GASOLINE MG/KG | | | 270. | 2000. |
| SURR.RECOVERY % | • | • | 109. | 130. |
| ANALYST: | | | RJ | RJ |

BROMOFLUOROBENZENE WAS USED AS THE SURROGATE

MG/KG = PPM

ND = NONE DETECTED (REPORTING LIMIT IS 10 MG/KG)

MI = HATRIX INTERFERENCE WITH SURROGATE RECOVERY

NA = NOT ANALYZED

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007

Phone 503-644-5300 • Fax 503-671-1404



HAHN & ASSOCIATES, INC. 434 N.W. 6TH AVE.

SUITE 203

PORTLAND, ORE. 97209-3600

GUY TANZ

796-0717 FAX 227-2209

JOB#2289

REVIEWED BY:

SM

REVIEW DATE:

4/26/93

TOTAL PETROLEUM HYDROCARBONS - GASOLINE
BY OREGON DEQ TPH-G

SAMPLE ID: 2289-930415-029 10933 OAL ID: 25-0127-SAMPLE DATE: 4/15/93 SOIL MATRIX: 4/22/93 EXTRACTION DATE: 4/26/93 ANALYSIS DATE: GASOLINE HG/KG 13. SURR.RECOVERY % 83. ANALYST: RJ

BROMOFLUOROBENZENE WAS USED AS THE SURROGATE

MG/KG = PPM

ND = NONE DETECTED (REPORTING LIMIT IS 10 MG/KG)

MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

NA = NOT ANALYZED

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007

Phone 503-644-5300 • Fax 503-671-1404



REVIEWED BY: RT

REVIEW DATE:

4.23.93

HYDROCARBON IDENTIFICATION (HCID) BY OREGON DEQ TPH-HCID

| SAMPLE ID: | 2289-930416-004 | 2289-930416-008 |
|------------------|-----------------|-----------------|
| OAL ID: 25-0127- | 10867 | 10868 |
| SAMPLE DATE: | 4/16/93 | 4/16/93 |
| HATRIX: | SOIL | SOIL |
| EXTRACTION DATE: | 4/21/93 | 4/21/93 |
| ANALYSIS DATE: | 4/21/93 | 4/21/93 |
| HCID: | ND | ND |
| • | • | • |
| SURR.RECOVERY % | 92. | 77. |
| ANALYST: | RJ | RJ |

ORTHO-TERPHENYL WAS USED AS THE SURROGATE

NA = NOT ANALYZED
GASOLINE REGION (C6 THRU C10)
DIESEL REGION (C10 THRU C28)
OIL AND BUNKER C REGION (BEYOND C28)
ND = NONE DETECTED (GASOLINE < 20 MG/KG, DIESEL < 50 MG/KG)
MI = HATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007 Phone 503-644-5300 • Fax 503-671-1404



HAHN & ASSOCIATES, INC. 434 N.W. 6TH AVE.

SUITE 203

PORTLAND, ORE. 97209-3600

GUY TANZ

796-0717 FAX 227-2209

J0B#2289

REVIEWED BY: 5

REVIEW DATE:

4/23/93

HYDROCARBON IDENTIFICATION (HCID) BY OREGON DEQ TPH-HCID

| SAMPLE ID: | 2289-930416-011 | 2289-930416-016 | 2289-930416-020 |
|------------------|-----------------|-----------------|-----------------|
| DAL ID: 25-0127- | 10869 | 10870 | 10871 |
| SAMPLE DATE: | 4/16/93 | 4/16/93 | 4/16/93 |
| HATRIX: | SOIL | SOIL | SOIL |
| EXTRACTION DATE: | 4/21/93 | 4/21/93 | 4/21/93 |
| ANALYSIS DATE: | 4/21/93 | 4/21/93 | 4/21/93 |
| HCID: | В | ND | OIŁ |
| | • | • | • |
| SURR.RECOVERY % | 9 0. | 90. | 85. |
| ANALYST: | RJ | RJ | LЯ |

ORTHO-TERPHENYL WAS USED AS THE SURROGATE

NA = NOT ANALYZED

GASOLINE REGION (C6 THRU C10)

DIESEL REGION (C10 THRU C28)

OIL AND BUNKER C REGION (BEYOND C28)

ND = NONE DETECTED (GASOLINE < 20 MG/KG, DIESEL < 50 MG/KG)

HI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY

OREGON ANALYTICAL LABORATORY

A Division of Portland General Electric 14855 S.W. Old Scholls Ferry Road Beaverton, OR 97007 Phone 503-644-5300 • Fax 503-671-1404

| | | HAHN AND ASSO | CIATE | es, In | NC. | | Í | AB(|)RA | TOF | ₹Y | ō | Rti | 6) | 7 | AN | AL | 41 | ica | <u>t</u> | S | | | C | H | AIN | 1 (| Œ | Cust | ODY |
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| | | 2289-930415-014 | ij | 1150 | 15'-6 | 34 | χ | | 1 | | | | | | | | | | | | | | | | | | | | | |
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APPENDIX D

Soil Cleanup Standard Matrix Worksheet

SOIL CLEANUP STANDARD MATRIX WORKSHEET

INTRODUCTION: This worksheet is intended to be used to determine the soil cleanup standard for the remediation of motor fuel and heating oil releases from underground storage tanks (USTs). OAR 340-122-301 to 340-122-360

EVALUATION PARAMETERS:

1. DEPTH TO GROUNDWATER: Vertical distance (to nearest foot) from the surface of the ground to the highest seasonal elevation of the saturated zone.

| Depth: | >100′ | 51-100 | 25-50′ | <u> <25'</u> | POINTS: 10 |
|---------|-------|--------|--------|-----------------|------------|
| Points: | 1 | 4 | 7 | 10 | |

Source: Field Observation

2. MEAN ANNUAL PRECIPITATION: From nearest appropriate weather station.

| Inches: | <20' | 20-45" | >45" | POINTS: 5 |
|---------|------|--------|------|-----------|
| Points: | 1 | 5 | 10 | |

Source: National Weather Service

3.NATIVE SOIL OR ROCK TYPE:

| Permeability: | Low | <u> Moderate</u> | High | POINTS: | 10 |
|------------------|-----------|------------------|------|---------|----|
| Points: | 1 | 5 | 10 | | |
| Source: Field Ob | servation | | | | |

4. SENSITIVITY TO THE UPPERMOST AQUIFER:

| Sensitivity: | Unusable | Potable not used | Potable | Sole Source | POINTS: 4 |
|--------------|----------|------------------|---------|-------------|-----------|
| Points: | 1 | 4 | 7 | 10 | |

Source: Estimate

5. POTENTIAL RECEPTORS: Distance to nearest well that draws water from aquifer of concern and the number of people at risk.

| Nearest Well: | <1/2 mile | 1/2 - 2 miles | >2 mile | |
|-------------------|-----------|---------------|---------|------------|
| Description: | Near | Medium | Far | |
| | • | | | POINTS: 10 |
| Number of People: | >3,000 | 100-3,000 | <100 | |
| Description: | Many | Medium | Few | |
| | | | | |

Sources: Worst Case Estimate

TOTAL POINTS: 39

Page 1 of 2

SOIL CLEANUP STANDARD MATRIX WORKSHEET

TOTAL POINTS: 39 Level 2 Cleanup Standard

If the Matrix Score evaluated is

- A) Greater than 40, the site must be cleaned up to at least the Level 1 standard
- B) From 25 to 40, inclusive, the site must be cleaned up to at least Level 2 standards
- C) Less than 25, the site must be cleaned up to at least the Level 3 standard

NUMERIC SOIL CLEANUP STANDARDS

| | Level 1 | Level 2 | Level 3 |
|----------------|---------|---------|-----------|
| TPH (Gasoline) | 40 ppm | 80 ppm | 130 ppm |
| TPH (Diesel) | 100 ppm | 500ppm | 1,000 ppm |

NUMERIC SOIL CLEANUP STANDARDS FOR THIS SITE

Level 2 Cleanup Standard

Total Petroleum Hydrocarbons (TPH):

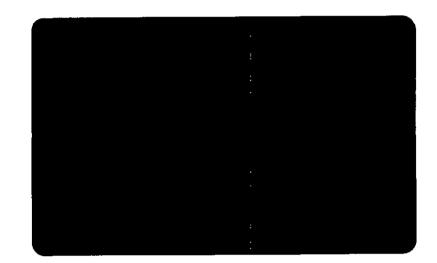
< 80 parts per million (ppm) for gasoline

< 500 ppm for diesel fuel and heavier petroleum hydrocarbons

(12/91)

Page 2 of 2

BRIX 001028



HAHN AND ASSOCIATES, INC. **Environmental Management**

434 NW 6th Avenue, Suite 203 Portland, Oregon 97209-3600 503/796-0717 • 503/227-2209 FAX

BRIX 001029

WORK PLAN FOR UNDERGROUND STORAGE TANK INVESTIGATION

Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

May 11, 2001

Prepared for:

Brix Maritime Company Portland, Oregon

Prepared by:

Hahn and Associates, Inc. Portland, Oregon

Project No. 5074

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GLOSSARY OF ABBREVIATIONS

TABLES

- 1 Proposed Soil Sampling Program
- 2 Proposed Groundwater Sampling Program
- 3 Sample Container, Preservation, and Holding Time Requirements

FIGURES

- 1 Site Location Map
- 2 Site Map
- 3 Historical Soil Results
- 4 Proposed Sampling Locations

APPENDICES

- A Example Field Logs and Forms
- B Site Health and Safety Plan

BRIX 001032

WORK PLAN FOR UNDERGROUND STORAGE TANK INVESTIGATION

Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

May 11, 2001

1. INTRODUCTION

Brix Maritime Company (Brix) has retained Hahn and Associates, Inc. (HAI) to conduct site characterization and risk-based assessment activities relating to upland area underground storage tank (UST) releases at the Brix Maritime Company site located at 9030 NW St Helens Road, Portland, Oregon (Figure 1). This Work Plan was prepared to characterize potential petroleum hydrocarbon impacts to soil previously detected at the site, and assess for the presence of potential petroleum hydrocarbon impacts to groundwater relating to past and present USTs

This Work Plan consists of four plans which are presented in the following order:

- 1) Site Characterization Plan (SCP) (Section 3.)
- 2) Project Management Plan (Section 4.)
- 3) Sampling and Analysis Plan (SAP) (Section 5.)
- 4) Health and Safety Plan (HASP) (Appendix B)

2. BACKGROUND

2.1 Site Location

The Brix Maritime Company facility (the "Site") is located at 9030 NW St. Helens Road, Portland, Oregon, Township 1 North, Range 1 West, Section 11, Tax Lot 800. The Site is bordered to the northeast by the Willamette River, to the southwest by rail road tracks and NW St. Helens Road, to the northwest by a bulk fuel storage facility, and to the southeast by industrial use property.

BRIX 001033

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2.2 Site Features

The Site consists of approximately 3.7 acres with two primary structures; an office building and a maintenance building. A covered "work barge" associated with the property is moored on the Willamette River. The topography at the Site is generally level with elevations of approximately 30 feet above mean sea level (msl) at the southwest property boundary to 20 feet msl at the top of the river bank to the northeast of the property. The site is generally developed and covered with asphalt, concrete, or buildings with a steep river bank, protected by rip-rap cover, sloping down to the Willamette River.

2.3 Site_History

Information on the site history is included in the Supplemental Preliminary Assessment (XPA) Summary Report¹ prepared by Anchor Environmental LLC for the Site. That XPA, however, contained incomplete information requiring clarification on the ownership and operation of the Site. The property was undeveloped prior to 1979 at which time Brix Maritime Company ("Brix"), a Delaware corporation, developed the property for use as a dispatch and coordination office for a tugboat fleet. In 1993, Brix became a wholly-owned subsidiary of Foss Maritime Company, a Washington corporation. Brix continues to own and operate the facility under a license allowing Brix to use the Foss name. Foss Maritime Company does not own or operate the facility, although the Foss name is displayed at the facility under the license granted to Brix². The facility use has remained the same since site development and is used for tug mooring, maintenance, fueling, and crew rotation.

2.4 Underground Storage Tank Operational History

Five underground storage tanks (USTs) are known to have been used at the site, two of which were decommissioned by removal (USTs #1 and #2) in December 1998. The five USTs were installed in 1979 in a single tank nest located adjacent to the Maintenance Building (Figure 2). The Oregon DEQ Facility Identification Number is #7374. The five USTs include two 20,000-gallon capacity diesel fuel tanks (UST #4 and UST #5), two 6,000-gallon capacity lubrication oil tanks containing 30-weight and 40-weight oil, respectively (UST #1 and UST #3), and one 2,000-gallon capacity gasoline tank (UST #2). All of the tanks and piping were constructed of single-wall steel at the time of installation.

BRIX 001034

Anchor Environmental LLC (2000). Supplemental Preliminary Assessment Summary Report, Foss Maritime Company (Brix) Facility, 9030 NW St. Helens Road, Portland, Oregon 97231-1127. October 2000.

² The use of the Foss name under license to Brix caused confusion in the XPA over the ownership and operation of the facility. The facility is operated by Brix and record title to the property comprising the Site remains in Brix's name.

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Based on a July 19, 2000, interview with Mr. Rafael Caballero of Brix Maritime Company, USTs #1, #3, #4, and #5 were piped to the covered maintenance barge in the Willamette River to service water craft. Transfer pipes run underground from the UST systems where they daylight along the river bank and run directly over water to the work barge. UST #2 was utilized for refueling of company vehicles; all piping to this tank runs underground to a fuel pump located adjacent to the west corner of the maintenance building.

2.5 Underground Storage Tank Release History

Two releases of petroleum products have been documented relating to UST systems at the site, both of which were reported under Oregon DEQ leaking UST File No. 26-93-0009. In 1993, a lubricating oil release was reported to the Oregon DEQ relating to a hole discovered in a 30-weight lube oil transfer line next to the UST nest. At that time, soil removal activities were conducted and approximately 60 feet of each of the steel UST product lines was removed and replaced with fiberglass piping³. Subsurface investigations conducted by HAI⁴ in the vicinity of the tank nest detected gasoline, diesel, and oil-range petroleum hydrocarbons in soil; however groundwater was not tested since the constituents of concern were not determined to have reached groundwater. The results of soil testing relating to the UST area are presented on Figure 3.

In 1998, USTs No. 1 and No. 2 were decommissioned by removal and USTs No. 3, No. 4, and No. 5, were upgraded. During tank upgrading activities, petroleum-hydrocarbons were encountered in the soil potentially due to an overfill at either UST No. 4 or No. 5; however, the specific tank was not documented. Soil samples were not collected to confirm the observed findings. The potential release was reported to Oregon DEQ.

2.6 Site Hydrogeology

Previous subsurface investigations conducted at the Site (HAI 1993b) indicate that shallow soils are composed of a silty gravel with some sand (Gravel Unit) from the surface to approximately 4 feet bgs, the depth varying depending on location. Underlying the Gravel Unit, a sand (Sand Unit) was observed to a depth of 20 to 25 feet bgs where a silty clay (Clay Unit) was encountered to the maximum depth of subsurface investigations at approximately 26.5 feet bgs. Concrete and gravel fill material was observed in two borings, B-1 and B-8, that were attempted to be installed inside the Maintenance Building; however, the concrete material prevented investigations deeper than 5 feet bgs. The Gravel

BRIX 001035

³ Hahn and Associates, Inc. (1993a). Underground Storage Tank System Investigation, Brix Maritime Company, 9030 NW St. Helens Road, Portland, Oregon. February 26, 1993.

⁴ Hahn and Associates, Inc. (1993b). Subsurface Investigation, Brix maritime Company, 9030 NW St. Helens Road, Portland, Oregon. (HAI Project No. 2289) August 12, 1993.

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Unit, Sand Unit, and concrete and gravel encountered beneath the Maintenance Building are considered to comprise what this Work Plan refers to as a Fill Unit at the site.

During the 1993 subsurface investigations (HAI 1993b) groundwater was encountered at a depth of approximately 25 feet bgs at the site with groundwater flow beneath the site assumed to be to the northeast towards the river.

2.7 Project Objectives

This Work Plan was designed with two primary objectives: 1) to collect information sufficient to evaluate the potential for UST-related releases to the Willamette River, and; 2) collect information sufficient to support risk-based closure of Oregon DEQ Leaking UST File No. 26-93-0009.

3. SITE CHARACTERIZATION PLAN

3.1 Investigation Approach

This Site Characterization Plan (SCP) was designed to meet Oregon DEQ's request for focused sampling to assess documented and potential releases of hazardous substances at the facility relating to USTs. The primary objectives of the investigations are to: 1) determine the nature and extent of previously identified petroleum hydrocarbons released to soil based on current regulatory requirements; 2) assess the potential for groundwater releases in the identified target areas and whether groundwater may be providing a chemical pathway to the river; and 3) characterize USTs sufficiently to support risk-based evaluation of Oregon DEQ Leaking UST File No. 26-93-0009.

This Work Plan outlines the proposed site characterization activities to meet the objectives outlined above. Site characterization activities will include soil sampling and screening-level groundwater sampling in an effort to determine the nature and extent of potential impacts relating to UST areas and releases. Such activities will be conducted primarily through the use of push probe methodology; however, due to limited access and underground utilities within release areas, alternative methods, such as hand auger sampling, may need to be utilized.

In summary, the site characterization activities will involve the installation of 16 push probe borings to depths ranging from 4 to 28 feet below ground surface (bgs). Screening-level groundwater samples will be collected from 7 of the push probe locations (groundwater is expected to occur at depths of 25 feet bgs. Selected soil and groundwater samples will be analyzed for the identified constituents of interest in the UST target area.

BRIX 001036

The site characterization activities described herein will be conducted in accordance with the Project Management Plan, Sampling and Analysis Plan (SAP), and Health and Safety Plan (HASP). The HASP is included in Appendix B.

3.2 Target Areas and Constituents of Interest

The primary targets of this investigation are the USTs and associated piping at the site. In addition, the area northeast of the UST nest will be targeted to evaluate whether the USTs represent a potential source of impacts to the Willamette River.

Waste and/or used oils have not been stored in the USTs at the site. Accordingly, contaminants associated with waste and/or used oils other than petroleum hydrocarbons and constituents are not considered constituents of interest (COIs). COIs relating to USTs containing gasoline, diesel fuel, and lubrication oil are as follows:

- 1) Total petroleum hydrocarbons (TPH) as gasoline, diesel fuel, and oil
- 2) Benzene, toluene, ethylbenzene, and xylene (BTEX)
- 3) Polynuclear aromatic hydrocarbons (PAHs) (including naphthalene)
- 4) Methyltertbutylether (MTBE)
- 5) Ethylene dibromide [1,2-dibromomethane (EDB)] and ethylene dichloride [1,2-dichloroethane (EDC)]
- 6) 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (1,2,4- and 1,3,5-TMB)
- 7) iso-propylbenzene and n-propylbenzene
- 8) Lead

3.3 Soil and Groundwater Characterization Plan

The proposed soil and groundwater sampling programs are summarized on Tables 1 and 2, respectively. The locations of proposed push probes are depicted on Figure 4. In general, soil samples will be selected for laboratory analysis at pre-determined depths that correspond to depths of previously-identified constituents of interest; groundwater samples will be collected at locations that will both evaluate for the presence of releases from USTs and piping and evaluate the potential for a groundwater to surface water pathway for those constituents of interest. Additional samples may be chosen based on field screening indicators, the likelihood of impacts, analytical results as they become available, and depths of relevant risk-based exposure pathways.

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Previous investigations determined that diesel-range and oil-range petroleum hydrocarbons were detected at concentrations ranging between 49 to 53,000 parts per million (ppm) of diesel and oil-range TPH in the vicinity of an underground piping trench at the Site. In addition, subsurface investigations detected gasoline-range petroleum hydrocarbons south of the UST area at one location, B-7, up to a concentration of 2,000 ppm. The proposed investigation in these areas was designed to determine the lateral and vertical extent of potential petroleum compounds as well as collect constituent parameters to support a risk-based assessment of the tank area.

Sixteen (16) push probes (B-14 through B-29) will be installed to depths between 24 to 28 feet bgs other than B-27 which will be advanced to 4 feet bgs. In general, all borings (except B-27) will be advanced at least to the base of the Fill Unit at the Site or refusal, whichever comes first.

B-14 through B-20 will be installed laterally away from the UST and piping areas to characterize the extent of potential petroleum compounds in soil. In addition, the locations of B-14 through B-20 will serve a dual purpose in that they will be used to sample groundwater for the presence of potential petroleum compounds in groundwater. Push probe locations B-19, and B-21 through B-26 will be placed in close proximity to UST and piping areas to better define the extent of petroleum impacted soil, if any, and to collect risk parameter data, if necessary. Borings B-27 through B-29 are located in previously-identified and remediated release areas to better define the vertical extent of potential petroleum compounds in soil and to collect "worst case" samples for a risk parameter analysis. Since the locations of B-27, B-28, and B-29 are located in areas of current operating USTs and piping, these areas will be excavated by hand to uncover tank piping, prior to initiating push probe sampling (see Section 5.).

Based on field screening observations, additional push probes, other than those currently proposed, may be installed. Any additional push probes will be installed in accordance with the SAP (Section 5.).

4. PROJECT MANAGEMENT PLAN

4.1 Project Organization

The project management for implementation of the site characterization activities, including sampling and reporting tasks, will be undertaken by Hahn and Associates, Inc. (HAI).

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Property Owner

Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon 97231 (503) 286-0631

Contact: Kim Maree Johannessen, Esq.

Johannessen & Associates, P.S.

5413 Meridian Ave. N., Suite C

Seattle, WA 98103 (206) 632-2000 (telephone) (206) 632-2500 (facsimile)

Project Management

Brix Maritime Company

Brix Maritime Company 9030 NW St. Helens Road Portland, OR 97231 (503) 286-0631

Contact: Kim Maree Johannessen, Esq. Johannessen & Associates, P.S. 5413 Meridian Ave. N., Suite C

> Seattle, WA 98103 (206) 632-2000 (telephone) (206) 632-2500 (facsimile)

Hahn and Associates, Inc.

Hahn and Associates, Inc. 434 NW Sixth Avenue, Suite 203 Portland, Oregon 97201 (503) 796-0717 Contact: Mr. Guy Tanz, Associate

Drilling Services

Geo-Tech Explorations, Inc. 19700 SW Teton Tualatin, Oregon 97062 (503) 692-6400 Contact: Mr. Peter Larson, Coordinator

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Laboratory Services

Environmental Services Laboratory 17400 SW Upper Boones Ferry Road, Suite 270 Portland, Oregon 97224 (503) 670-8520 Contact: Mr. Keith Hunter, Laboratory Manager

Utility Locate Services

Locates Down Under 15725 SE Hanwood Lane Milwaukie, Oregon 97267 (503) 654-2637 Contact: Mr. Carson Smith, President

4.2 Project Schedule

Work activities will begin as soon as possible upon Brix's authorization to proceed. The activities outlined in this Work Plan are anticipated to take approximately 16 weeks to complete. A final report can be provided within three to four weeks following completion of the site work.

4.3 Reporting

Upon receipt of the analytical data, the results of the investigation activities will be included in a written report for the site. The report will include a site map showing the sample locations, a description of the hydrogeologic conditions encountered, a representation of the vertical and horizontal distribution of any contamination encountered, and the analytical results. Analytical results will be reported in tabular form, as will details of soil borings and field screening. The appendix of the report will include laboratory analytical reports and chain-of-custody documentation. The report will also include information on site operations and hazardous materials usage as requested by Oregon DEQ in Items 3, 4, 5 and 6 of its letter dated December 19, 2000.

BRIX 001040

5. SAMPLING AND ANALYSIS PLAN

This Sampling and Analysis Plan (SAP) is designed to cover all potential phases of Site characterization and investigation activities conducted on the Site with focus on investigation of UST areas. This SAP includes a somewhat more comprehensive description of procedures and sampling methodologies than necessary for use as part of the Site Characterization activities.

5.1 Investigation Methods

As described in the following sections, a number of investigative methods may potentially be used to collect soil and groundwater samples at the Brix Maritime Company site. Subsurface soil samples will be collected by push probe and hand auger methods. Groundwater samples will be collected from temporary well points installed in push probe borings.

A number of investigative methods may be used to collect soil and groundwater samples at the Site. Subsurface soil samples may be collected from drilled soil borings, push probe borings, and/or hand auger borings including drive-hammer devices. Screening-level groundwater samples may be collected from either temporary well points installed in drilled soil borings, or from drive points installed in push probe borings.

Soil samples will typically be collected based on field screening and at pre-determined locations that are chosen based on available information, as described in the Site Characterization Plan (SCP). These samples will be used to determine the nature and extent of impacts, if any, to soil and groundwater.

All investigation activities, where applicable, will be conducted in accordance with the Oregon Groundwater Law (Oregon Revised Statute (ORS) Chapter 537) and the Rules for Construction and Maintenance of Monitoring Wells and Other Holes in Oregon (Oregon Administrative Rules (OAR) Chapter 690, Division 240).

5.1.1 Soil Boring Installation Procedures

Soil borings will be installed by any number of methods depending on soil type and equipment access. The first preference for soil boring installation will be by push probe techniques. The soil types and proposed depths of investigation at this site appear to be appropriate for use of push probe drilling methodology. In areas where soil types are not appropriate for push-probe methodology (i.e. in some gravelly or cemented soils), drilled borings can be installed by any number of methods. In areas where underground utilities are present and/or where only very shallow soil samples are required, hand auger borings may be installed.

BRIX 001041

• Push-Probe Borings

All proposed borings will be attempted by push probe methodology. All push probes will be installed by a truck-mounted push probe unit that uses a 1.5-inch outside-diameter (OD) hydraulically-driven steel rod will be used to advance the proposed push probe soil borings. Soil and/or screening-level groundwater samples may be collected from these borings.

In areas that are not accessible by the truck-mounted push probe, a Bosch Roto-hammer unit equipped with 1-inch steel rod and large bore sampler will be used. Where needed (inside buildings) a 4-inch diameter concrete core will be cut to provide access to the subsurface for the Roto-hammer equipment.

• Drilled Soil Borings

Drilled borings are not proposed for the activities; however they can be installed in areas where soil types are not appropriate for push-probe methodology (i.e. in some gravelly or cemented soils). Drilled borings can be installed by any number of methods. If necessary, drilled borings would be attempted using a hollow stem auger drilling rig equipped with 4 1/4-inch inside-diameter (ID) auger. Soil borings with monitoring well installations would be completed with a hollow stem auger drilling rig equipped with 6 3/4-inch ID auger. The suitability of hollow stem auger installed borings will be evaluated in situations where non-aqueous phase liquids (NAPLs) are expected or encountered. To date, NAPLs have not been identified at the Site.

Hand Auger Soil Borings

Hand-augured soil borings will be installed manually with a stainless-steel hand auger equipped with a 2-inch OD hollow bit.

5.1.2 Soil Boring Abandonment Procedures

Following installation, each drilled boring, push probe, or hand auger boring will be backfilled with granular bentonite from the bottom of the hole to land surface. For borings with temporary well points, the well point will be pulled out of the hole and the sand pack drilled out prior to abandonment.

In areas of asphalt or concrete paving, the borings will be backfilled with bentonite chips to within 1.0 feet below ground surface (bgs) and capped with concrete to the land surface.

BRIX 001042

5.2 Analytical Methods and Procedures

Currently identified COIs in soil at the Site include total petroleum hydrocarbons (TPH) as gasoline, diesel fuel, and oil; benzene, toluene, ethylbenzene, and xylene (BTEX); polynuclear aromatic hydrocarbons (PAHs) including naphthalene; methyltertbutylether (MTBE), ethylene dibromide (EDB), ethylene dichloride (EDC); 1,2,4-trimethylbenzene (1,2,4-TMB) and 1,3,5-TMB; iso-propylbenzene and n-propylbenzene; and lead.

All analytical methods will follow standard U.S. Environmental Protection Agency (EPA) procedures as outlined in *Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods* (SW-846) as updated and Oregon DEQ-approved methods where necessary.

The analytical methods expected for use during site characterization activities are as follows:

| <u>Parameter</u> | Analytical Metho | <u>od</u> |
|---------------------------|--------------------|--------------------|
| | <u>Soil</u> | Water |
| Gasoline-Range TPH | NW-TPH-Gx | NW-TPH-Gx |
| Diesel-Range TPH | NW TPH-Dx | NW-TPH-Dx |
| Oil-Range TPH | NW TPH-Dx | NW-TPH-Dx |
| BTEX | EPA 8021B or 8260B | EPA 8021B or 8260B |
| VOCs (MTBE, EDB, EDC, | | |
| 1,2,4- and 1,3,5-TMB, | | |
| iso- and n-propylbenzene, | | |
| naphthalene | EPA 8260B | EPA 8260B |
| PAHs | EPA 8270 SIM | EPA 8270 SIM |
| Lead | EPA 6010 | EPA 200.7 |
| | | |

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5.3 Soil Sampling Procedures

5.3.1 Soil Sample Collection Procedures

Soil samples will be collected via the following methods which are described in more detail below: 1) split-spoon sampling device in drilled soil borings; 2) macrocore in push probe borings; and 3) drive-hammer sampler in hand auger borings. Soil and groundwater samples will be collected at locations as indicated in the SCP.

Upon collection, all samples will be labeled and transferred to a chilled container for shipment to the analytical laboratory. Standard sampling protocols, including the use of chain-of-custody documentation, will be followed for all sampling procedures as discussed in Section 5.8.

Installation of all soil borings will be observed and logged by a geologist, engineer, or environmental scientist experienced in logging soils, under the direct supervision of an Oregon Registered Geologist (R. G.).

• Drilled Soil Borings

Soil samples from drilled borings will be collected with a 2-inch OD split-barrel sampling device that will be driven into the undisturbed soils 1.5 feet ahead of the drill bit, using the Standard Penetration Test (SPT) or 5-foot long 3-inch diameter split barrel core sampler.

Soil samples collected from the split-spoon sampling device or will be manually transferred to a 9-ounce sample jar and capped with Teflon lined lid.

• Push Probe Borings

In push probe borings, continuous soil cores will be collected using a 2-inch OD, 4-foot long, stainless-steel, Macro-Core sampler, fitted with a polyvinyl chloride (PVC) sleeve, that will be advanced 4 feet into the undisturbed soils.

Where limited access push probe borings are utilized (using hand-held Roto-hammer equipment), soil samples will be collected using a 1.5-foot long, stainless steel split barrel sampler fitted with a PVC sleeve that will be advanced 1.5 feet into the undisturbed soils.

Soil samples will be collected from push probes by cutting open the PVC sleeve and placing soil in a 9 ounce sample jar that is capped with Teflon lined lid.

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· Hand Auger Borings

In cases where access or underground utilities are an issue, soil samples may be collected from a hand auger equipped with a 2-inch OD hollow bit. Once the desired sampling depth is attained, the hand auger will be removed from the hole and soil collected from the auger tip.

In cases where volatile compounds will be analyzed, samples will be collected with a decontaminated slide-hammer sampler equipped with a 6-inch long brass sleeve. Once the desired sampling depth is reached by the hand auger equipment, it will be removed whereupon the slide-hammer device will be used to drive the brass sleeve 6-inches into the undisturbed soils. The brass sleeve will immediately be capped with Teflon paper, plastic end caps, and sealed with non-volatile silicon tape.

5.3.2 Soil Sample Description

The properties of all soil samples will be observed in the field by an HAI geologist, engineer, or environmental scientist experienced in logging soils, under the supervision of an Oregon R.G. The properties of the soil, including color, moisture, plasticity, and grading of coarse-grained soils, will be noted in the field and incorporated into a field boring table for each subsurface boring. An estimate of the Unified Soil Classification System (USCS) soil type designation (ASTM D 2487-85) will also be shown on the boring log. The USCS soil type designation will be a field estimate only and will not be confirmed by laboratory analyses. Visual or olfactory evidence of contaminant occurrence in the samples, if present, will also be noted on the boring log.

5.3.3 Soil Field Screening Procedures

All soil samples will be screened in the field for the presence of contaminants by visual (color), olfactory, sheen, and headspace vapor methods. The results of the field screening observations will be noted on the field boring log.

The presence of sheen will be assessed by placing clean tap water in a black pan and introducing approximately 5 grams of disaggregated soil to the water. The observation for the presence or lack of sheen is a relative indicator of contamination.

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Organic vapor levels in the soil samples will be measured by the headspace vapor method utilizing a MicroTIP Model MP-1000 equipped with a PID and a 10.6 electron volt (eV) lamp. Immediately following the collection of the sample, approximately 4 ounces of soil will be placed in a one-quart plastic bag and sealed. The sample will then be set aside for an approximate 20-minute stabilization period where the sample is allowed to reach ambient temperature. The detector probe is then inserted through the seal into the bag to collect the headspace sample. The results of the headspace screening will be recorded on the boring log in parts per million (ppm). The results of the headspace method will be used for qualitative screening purposes only.

5.4 Groundwater Sampling Procedures

All screening-level groundwater samples will be collected from push probe borings during the Site Characterization activities. Groundwater samples will be collected from push probe borings by attaching a 4-foot long stainless steel well point to the probe and setting it across or beneath the anticipated groundwater level. For vertical profiling, the well point is directly driven to the desired depth for sampling. Once the desired depth is reached, the outer protective sheath is pulled back to expose the screen. Immediately following well screen placement, a water level measurement will be made with an electric water level meter. Groundwater will be purged from the screen by inserting a disposable polyethylene tube equipped with a check valve down the interior of the probe and a vacuum pump will be used to remove at least 1 borehole volume of water.

5.5 Decontamination Procedures

All drilling and push probe equipment will be steam-cleaned between drilling locations to prevent cross-contamination. All soil sampling equipment will be decontaminated prior to each sample by using a detergent (Alconox) solution wash, followed by two separate potable water rinses. In the case of equipment that has been used to sample obviously impacted soil with visible product, a hexane wash will be added between the first and second potable water rinse.

The peristaltic pump will not need decontamination since water never comes in contact with any re-usable part.

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5.6 Investigative Derived Waste (IDW)

Investigative derived waste (IDW) will be managed in a manner that is consistent with the U.S. Environmental Protection Agency (EPA) Guide to Management of Investigation Derived-Wastes dated January 1992.

All soil cuttings, purge water, decontamination water, and development water generated during the investigation activities, will be containerized and left on-site pending a determination as to appropriate disposition. Disposal of all IDW will take place as soon as practicable following characterization of the waste.

All disposable personal protective equipment (gloves, etc.) and disposable sampling equipment (sleeves, bailers, tubing, etc.) generated during any sampling event will be disposed of at a permitted municipal solid waste disposal facility.

5.7 Quality Assurance (QA)/Quality Control (QC)

Three types of QC field samples may be used for the investigation activities including field duplicates, trip blanks, and field equipment blanks. Analytical parameters for QC samples may change with each area that is investigated at the site.

Soil field duplicates are not proposed for this project. One duplicate groundwater sample will be collected and analyzed for volatile compounds.

One trip blank sample will be collected for every three days of groundwater sampling. Following completion of field activities, a review of field procedures will be conducted and the need for trip blank analysis will be determined. Trip blank samples for non-volatile compounds are not proposed. The trip blanks will be prepared by the analytical laboratory, and placed in the sample cooler prior to arrival on-site.

One field equipment blank will be collected for every screening level groundwater sampling event. Following completion of field activities, a review of field procedures will be conducted and the need for field equipment blank analysis will be determined. Following decontamination of the temporary well screen, de-ionized water will be passed through it, and the effluent water will be collected in appropriate sampling containers.

Laboratory QC for this project will involve standard EPA QC guidelines as described in *Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods* (SW-846) and therefore will not be repeated here. Laboratory QC will include calibration standards, laboratory control samples, reagent blanks, matrix spikes, matrix spike duplicates, surrogate spikes, and laboratory duplicates.

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5.8 Sample Handling Procedures

5.8.1 Sample Containers

The sample container, preservation, and holding time requirements for each sample matrix and the anticipated analytical methods are summarized on Table 3. All samples will be transferred to the appropriate sampling containers and placed into a chilled (4°C) transport container for shipment to the laboratory. The chilled transport containers (coolers) will be utilized for temporary storage of the samples.

5.8.2 Sample Labels

A sample label will be attached to each sampling container prior to the sampling event. Information to be included on the label will include the following:

- 1) Sample number
- 2) Date and time of sample collection
- 3) Initials of person collecting the sample
- 4) HAI project number

Individual samples will be identified using a unique sample number that includes a sample prefix consisting of the HAI project number and a six digit date code. The prefix will be followed by an individual sample collection number that will be assigned sequentially as the samples are collected (e.g. 5074-010426-001).

5.8.3 Chain-of-Custody Record and Shipment

Chain-of-custody (COC) procedures will be followed from the time of sample collection to the conclusion of laboratory analysis.

Field COC procedures include:

- Label containers with date, time and sampler information.
- Complete chain-of-custody forms for all samples en route to laboratory. An example of the Chain-of-Custody form is attached at the end of this appendix. Upon transferring samples to the laboratory sample custodian, designated staff will sign, date and note the time of transfer on the chain-of-custody form.

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- Ship samples in ice chests sealed with custody seals, unless relinquished directly to a laboratory representative. The integrity of the seals is established at the laboratory by the laboratory sample custodian.
- Ensure that the samples are in possession or view of field staff or in secure storage at all times.
- Transport samples to the laboratory as soon as possible, observing appropriate preservation and holding-time requirements.
- Transfer custody of the samples to the appropriate holding area (refrigerator, cooled ice chest). Document the transfer on the appropriate COC record.
- Notify the appropriate people that the samples have arrived.

Upon receipt of the samples at the laboratory, the laboratory sample custodian will inventory the samples by comparing sample labels to those on the COC document. The custodian will enter the sample number into a laboratory tracking system by project code and sample designation. The custodian will assign a unique laboratory number to each sample and will be responsible for distributing the samples to the appropriate analyst or for storing samples in an appropriate secure area.

5.9 Documentation Procedures

Documentation of field procedures, observations, and measurements will be provided through the use of field logs, chain-of-custody, and photographs.

All data collection activities will be documented using waterproof field forms. All field entries will be signed, dated, and as detailed and descriptive as possible. If an incorrect entry is made on any form, it will be lined out, the correct information entered, and the correction will be initialed and dated by the person making the correction.

Overall documentation of the nature and timing of field activities will be provided daily with an HAI Project Field Notes form. All borings and wells will be documented with a field Boring Log form. Development, purging, and sampling of any wells or temporary well points will be documented with a Groundwater Sampling Summary form. Investigative wastes will be documented using an IDW Inventory form. Examples of these forms are included as Appendix A.

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5.10 Equipment Calibration and Maintenance Procedures

All field equipment will be calibrated prior to use according to the manufacturer's instructions. Equipment that fails calibration or fails to operate properly will be removed from service and segregated from the operational equipment. Such equipment will be repaired and re-calibrated if possible, or replaced. Preventive maintenance of field equipment is performed according to the procedures indicated in the manufacturer's manuals.

Laboratory analytical equipment and instruments will be calibrated in accordance with the laboratory's internal quality assurance/quality control (QA/QC) program.

5.11 Data Reduction and Validation

All field data will be summarized and recorded on appropriate field forms. Descriptive data including soil types, field screening results, observations, and water levels will be summarized in a final appropriate format on boring logs or tables.

Laboratory data will be recorded by a computer system that collects and compiles raw data. The analytical laboratory will conduct necessary QC calculations that will be summarized in final laboratory reports. All final laboratory reports will be included as an appendix or appendices to the site characterization report. In addition, all analytical data will be summarized in tabular form.

Analytical data will be assessed to ensure that they are of acceptable quality. This assessment will include a review of the following:

- Sampling dates
- Requested analysis
- Chain-of-Custody documentation
- Sample preservation
- Holding times
- Method blanks
- Surrogate recoveries
- Matrix spike results
- Matrix spike/matrix spike duplicate analyses
- Laboratory duplicates
- Field duplicates
- Laboratory control samples
- Method reporting limits above requested levels
- Any additional comments or difficulties reported by the laboratory
- Overall laboratory assessment of data quality

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6. CULTURAL RESOURCE IDENTIFICATION

Any cultural resources, if identified, during the work activities, will be managed according to the Oregon DEQ – EPA Memorandum of Understanding (MOU) dated February 8, 2001. In the event that cultural resources are encountered the following steps will be taken:

- 1) Stop work immediately in the vicinity of the find,
- 2) Provide any notifications required by Oregon Revised Statute (ORS) 97.745 and ORS 358.920
- 3) Immediately notify Brix Maritime Company who will be responsible for coordinating the notification of the Oregon DEQ
- 4) Use best efforts to ensure that Brix Maritime Company and its contractors consider the find confidential

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GLOSSARY OF ABBREVIATIONS

ASTM American Society of Testing and Materials

bgs below existing ground surface

BTEX benzene, toluene, ethylbenzene, and xylene

C degrees centigrade

DEQ Department of Environmental Quality

EDB ethlylenedibromide EDC ethylenedichloride

EPA U.S. Environmental Protection Agency

eV electron volt ID inside diameter

IDW investigative-derived waste

MTBE methyltertbutylether
NAPL non-aqueous phase liquid
OAR Oregon Administrative Rule

OD outside diameter

ORS Oregon Revised Statutes

OWRD Oregon Water Resources Division PAHs polynuclear aromatic hydrocarbons

PID photoionization detector
ppm parts per million
PVC polyvinyl chloride
QA quality assurance/
QC quality control

SCP Site Characterization Plan SAP Sampling and Analysis Plan SPT standard penetration test

TMB trimethylbenzene

TPH total petroleum hydrocarbons
USCS Unified Soil Classification System

VOCs volatile organic compounds

BRIX 001052

TABLE 1 - Proposed Soil Sampling Program

Work Plan for Underground Storage Tank Investigation Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

HAI Project No. 5074

| Boring Numbers | | | Collect Groundwater Sample | | Tentative Soil Samples Selected for Analysis (feet bgs) | Analytical Parameters |
|-----------------------------|-------|-------------------------|----------------------------------|---|---|---|
| B-14 and 15 ムム57 DAY | 28 · | Continuous Soil Core | Yes | 0 | Based on field screening | TPH Expanded List ¹ |
| B-16 and B-17 L-A57 DAY. | עני ו | Continuous Soil Core | Yes | 2 | 10'-12' bgs and base of Fill Unit and/or water table; others based on field screening | TPH Expanded List ¹ |
| B-18 | 28 | Continuous Soil Core | Yes | 2 | 15.5' bgs and base of Fill Unit and/or water table; others based on field screening | TPH Expanded List ' |
| B-19 | 28 | Continuous Soil Core | Yes | 2 | 15.5' bgs and base of Fill Unit and/or water table; others based on field screening | TPH Expanded List ¹ |
| B-20 LAST DAY | 28 | Continuous Soil Core | Yes | 0 | Based on field screening | TPH Expanded List ¹ |
| B-21, B-25, B-26 | 24 | Continuous Soil Core | No | 2 | 4'-6' and 12'-16'; others based on field screening | TPH Expanded List ¹ |
| B-22 | 28 | Continuous Soil Core | No | 2 | 15.5' bgs and base of Fill Unit and/or water table; others based on field screening | TPH Expanded List ¹ |
| B-23 and B-24 | 28 | Continuous Soil Core | No | 1 | Base of fill unit or water table; others based on field screening | TPH Expanded List ¹ |
| B-27 | 4. | Continuous Soil Core | No | 1 | 3' bgs | TPH Expanded List at 3' bgs |
| B-28 | 28 | Continuous Soil Core | No | 3 | 6', 12', base of Fill Unit and/or water table; others based on field screening | TPH Expanded List at 12' and base of Fill Unit |
| B-29 | 28 | Continuous Soi Core | No | 2 | 12' and base of Fill Unit and/or water table; others based on field screening | TPH Expanded List at 12' and base of Fill Unit bgs |



Note:

bgs = below ground surface

PB = propylbenzene

BTEX-N = benzene, toluene, ethylbenzene, xylene and naphthalene

EDB = ethylene dibromide

EDC = ethylenedichloride (1,2-DCA)

MTBE = methyltertbutylether

PAHs = polynuclear aromatic hydrocarbons

TMB = trimethylbenzene

TPH = total petroleum hydrocarbons by HCID method and follow up quantitation, unless otherwise indicated

TPH-G = TPH method for gasoline-range petroleum hydrocarbons

TPH-Dx = TPH method for diesel- and oil-range petroleum hydrocarbons

1 = Expanded parameter analysis to be based on contaminant type, occurrence, and concentration

Expanded List = BTEX-Naphthalene, EDB, EDC, 1,2,4- and 1,3,5-TMB, iso- and n-BTB, MTBE, PAHs, and lead

TABLE 2 - Proposed Groundwater Sampling Program

Work Plan for Underground Storage Tank Investigation Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

HAI Project No. 5074

| Push Probe Boring Numbers | Proposed Boring Depths (feet bgs) | | Tentative Number of Groundwater Samples to be Analyzed | Analytical Parameters |
|------------------------------|--------------------------------------|---------|--|-------------------------------------|
| B-14 through B-20 | 28 | 24 - 28 | 7 | Expanded List |
| Field Duplicate | - | - - | 1 | Expanded List |
| Trip Blank | - | | 0 | Based on review of field procedures |
| Equipment Blank | • | - | 0 | Based on review of field procedures |

Note:

bgs = below ground surface

PB = propylbenzene

BTEX = benzene, toluene, ethylbenzene, xylene

EDB = ethylene dibromide

EDC = ethylenedichloride (1,2-DCA)

MTBE = methyltertbutylether

PAHs = polynuclear aromatic hydrocarbons

TMB = trimethylbenzene

Expanded List = BTEX-Naphthalene, EDB, EDC, 1,2,4-TMB and 1,3,5-TMB, iso-PB and n-PB, MTBE, PAHs, and lead

STLTERED AS PER DEQ UST PROG.

BRIX 001055

Updated: 5/1/01 GHT File: 5074 SCP Tables Page 1 of 1 HAHN AND ASSOCIATES, INC.

TABLE 3 Sample Container, Preservation, and Holding Time Requirements

Work Plan for Underground Storage Tank Investigation Brix Maritime Company Facility 9030 NW St. Helens Road

Portland, Oregon Project No. 5074

| Sample Container | Preservation | Holding Time |
|----------------------------|---------------------------------|---------------------------|
| 8-ounce glass jar | Cool to 4 C | extract within 14 days |
| 1-liter glass amber bottle | Cool to 4 C | extract within 7 days |
| 8-ounce glass jar | Cool to 4 C | 14 days |
| (3) 40-ml VOA vials | Cool to 4 C | 14 days |
| 8-ounce glass jar | Cool to 4 C | extract within 14 days |
| 1-liter glass amber bottle | Cool to 4 C | extract within 7 days |
| 8-ounce glass jar | Cool to 4 C | 14 days |
| (3) 40-ml VOA vials | Cool to 4 C HCl pH<2 | 14 days |
| 8-ounce glass jar | Cool to 4 C | 14 days |
| (3) 40-ml VOA vials | Cool to 4 C HCl pH<2 | 14 days |
| 8-ounce glass jar | Cool to 4 C | 14 days |
| 1-liter glass amber bottle | Cool to 4 C | extract within 7 days |
| 8-ounce glass jar | Cool to 4 C | 6 months |
| 500-ml plastic | Cool to 4 C HNO ₃ | 6 months |
| 1 | 500-ml plastic | |

NOTE: BTEX = benzene, toluene, ethylbenzene, xylene

C = degrees centigrade

EDB = ethylenedibromide (1,2-dibromoethane)

EDC = ethylenedichloride (1,2-dichloroethane)

EPA = U.S. Environmental Protection Agency

FID = flame ionization detector GC= gas chromatography

HCl = hydrochloric acid

 $HNO_3 = nitric acid$

ICP = inductively coupled plasma

MS = mass spectroscopy

MTBE = methyltertbutylether

PID = photo ion detector

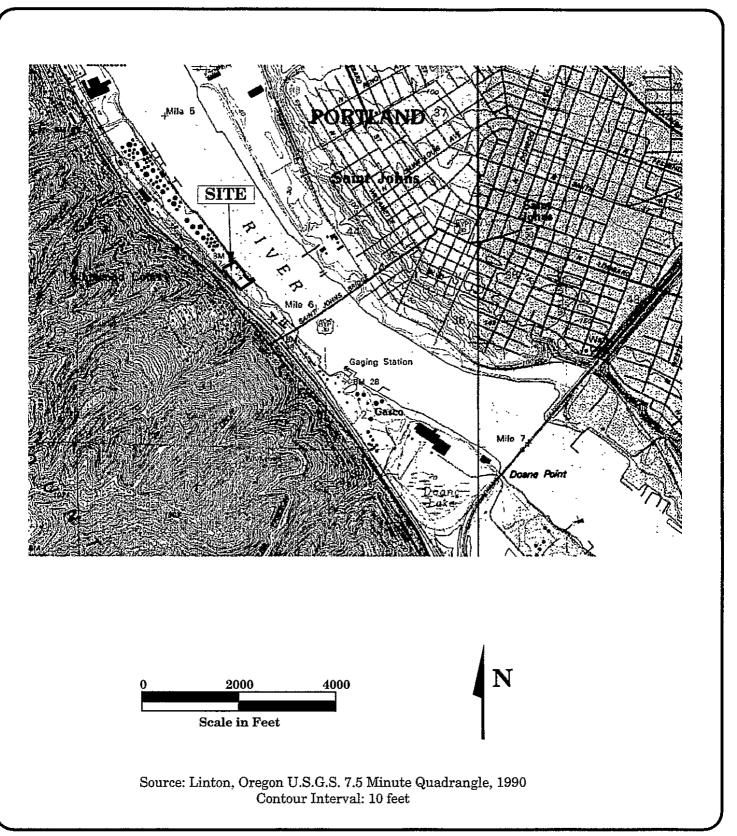
PVC = polyvinyl chloride

SIM = Selective Ion Mode

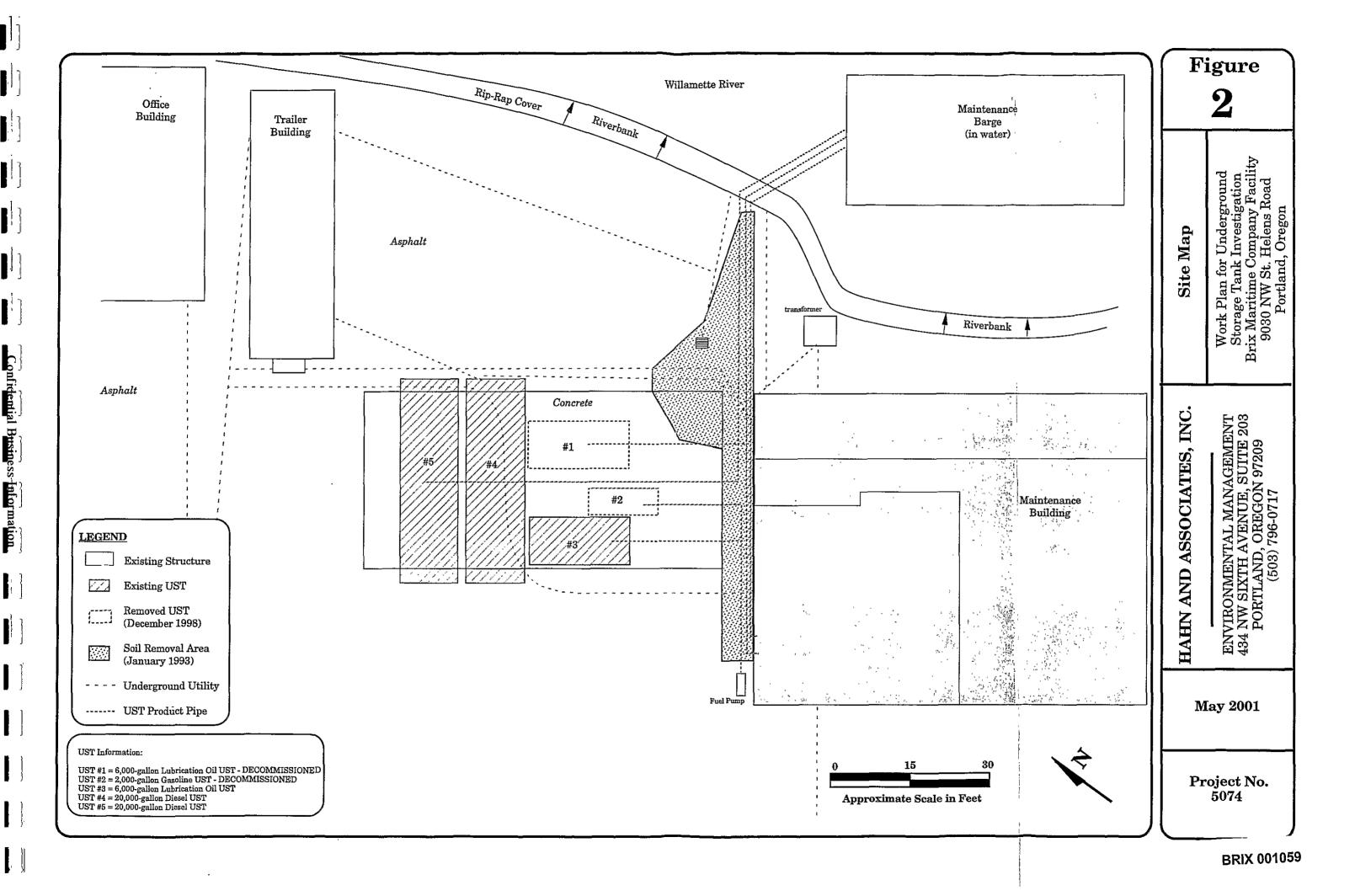
TPH = total petroleum hydrocarbons

BRIX 001056

Updated: 5/1/01: GHT File: 5074 SAP Container HAHN AND ASSOCIATES, INC. Page 1 of 1



| HAI Project | HAHN and ASSOCIATES | Site Location Map | FIGURE |
|-------------|--|---|--|
| No. 5074 | INCORPORATED | Work Plan for Underground Storage | 1 |
| May 2001 | ENVIRONMENTAL MANAGEMENT 434 NW SIXTH AVENUE, SUITE 203 PORTLAND, OREGON 97209 503/796-0717 | Tank Investigation Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon | |



Confidential Business

Information

BRIX 001061

APPENDICES

BRIX 001062

Confidential Business Information

APPENDIX A

Example Field Logs and Forms

| al Well epth (ft) | Static Water Level (ft) | Water Column (ft) | Convert Factor (gal/foot) | One Well Vol (gal) | Three Well Vol (gal) | | |
|-------------------------|-------------------------|-------------------------|---------------------------------|--------------------------|-------------------------|--|--|
| epth (ft) | Water Level (ft) | Column (ft) | Factor (gal/foot) | Well Vol (gal) | Vol (gal) | | |
| ell = 0.1' | | | | | | | |
| | 7 gallons/lin | ear ft | 4" well = 0. | .66 gallons/l | inear ft | | |
| | 7 gallons/lin | ear ft | 4" well = 0. | .66 gallons/l | inear ft | | |
| | 7 gallons/lin | ear ft | 4" well = 0. | .66 gallons/l | inear ft | | |
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| Sample Containers | | | | | | | |
| Number Type Preserv | | | | Analytical I | nalytical Parameters | | |
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| Well Purg | e Data | | Total Vo | lume to | Purge |
|-----------|-------------------------------|---|---------------------------------|---------|----------|
| Time | Volume Purged (gallons) | | Temperature degrees (C/F) | 1 | Comments |
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| Purge Water Dispos | tion | | | | |
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| Drum No. | Storage Tank No. | On Ground | Other | — | |

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Page 1 of 1

| HAHN and ASSOCIATES, INC | | | | |) <u>.</u> | | | | | | | | | | | |
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| N S S | SAMPLE NUMBER | TIME | HEADSPACE (ppm) | AB RESULI TPH (ppm) | P.T. 0.55 |)VE | DEPTH (feet) | ΜQ | STRATA (USCS) | SURFACE ELEVATION: | | | | | | |
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| HAHN AND ASSOCIATES, INC. Environmental Management | | | | | Laboratory | | | | | ···- | | | | | CHAI | N OF | CU | STODY | |
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| 434 NW Sixth Avenue, Suite 203 • Portland OR 97209 (503) 796-0717 • Fax (503) 227-2209 | | | | | | | Lai |) Proj | ect No. | | | | | | | Chain of | Custody | No. | |
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HAHN AND ASSOCIATES, INC. PROJECT FIELD NOTES

MicroTip/PID

Magnetometer

Measuring Wheel

Bailer (disposable)

Hand Auger

Power Tool

Tubing (well)

Water Filters

Locking Caps

Arrive Site:

Locks

Minutes:

Task Description

Gas Meter (GasTech)

WORK FORCE

HAI EQUIPMENT
Cond/pH/Temp Meter

Water Level Meter

Interface Probe

Turbidity Meter

Air Pump (Sensidyne)

HAI SUPPLIES
Gloves, Nitrile (pr.)

Gloves, Solvex (pr.)

Tyvek, coated

ACTIVITIES
Leave Office:

Booties (pr.)

Time

Gloves, Edmont (pr.)

Respirator Use/ Hours:

DO Meter

Subcontractor Subcontractor

HAI

| | | Page 1 of |
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| | Project Manager | |
| | SITE | |
| | Conditions | |
| | Temperature | |
| | | |
| | | |
| | UV Box | |
| | Wtr Filter Unit | |
| | Aquifer Test | |
| | Bailer (SS or Teflon) | |
| | Data Logger (Hermit) | |
| | | |
| | | <u>-</u> |
| | Concrete (bags) | |
| | Stakes | |
| | Resp. Cartridges (pr.) | |
|) | Sample Tubes | |
| | Sensidyne Tubes | |
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EQUIPMENT

Rental/Vendor

Rental/Vendor

Pump, Peristaltic

Pressure Transducer

Deionized Water (gal)

Distilled Water (gal)

Pump, Purge Pump, Submersible

Generator

Troll 4000

Caution Tape

Teflon Tape

Labels

Leave Site:

Odometer Out:

HAHN AND ASSOCIATES, INC. PROJECT FIELD NOTES

Page ____ of ____ Date: Project: 5074 Project Manager:

| CONTINUATION | SHEET |
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| Project Name | Brix Maritime | | | | Project Number | 5074 | | | |
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| | St. Helens Highw | ay | - | | Project Manager | | | • | |
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| | | | < | Fill Out In Field | Follow-Up> | | | | |
| Container# | Container Type | Contents | Date of Section | Labeled As | Waste Determination | Date of Disposal | Disposal Method | Disposal Location | Comments |
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| | 32-gal drum Other (explain) | Purge Water Decon Water | | Special Special Non-hazardous | Special Non-hazardous | | Consite Disposal | TPS Arlington | |
| | | PPE Sampling Supplies | | Other (explain) | Other (explain) | A SAME TO SAME | | Other (indicate) | |

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| Updated By: | Date: | Updated By: | Date: |

APPENDIX B

Site Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

May 11, 2001

Prepared by:

Hahn and Associates, Inc. Portland, Oregon

HAI Project No. 5074

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| EX I 1 | AOMMI | 31,17 | |
| A | Materia | al Safety Data Sheets | |
| В | Hospita | al Location Map | |
| | | | |

BRIX 001075

SITE HEALTH AND SAFETY PLAN

Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon

May 11, 2001

1. INTRODUCTION

This site-specific Site Health and Safety Plan (HASP) has been developed as required by the Occupational Safety and Health Administration (OSHA) according to the Code of Federal Regulations (CFR) 29 CFR 1910.120. The Site Health and Safety Plan includes discussion under the following section headings: Site Description; Organization and Coordination; Site Control; Hazard Evaluation; Personal Protective Equipment; Communication Procedures; Decontamination Procedures; and Site Safety and Health.

This Site Health and Safety Plan applies to members of the Hahn and Associates, Inc. (HAI) field staff and HAI subcontractors. The Plan is not intended for use by other consultants or contractors working at the site. In addition, this HASP applies only to upland areas of the Brix Maritime Company site (the "Site").

This HASP was designed to meet health and safety requirements for conducting work activities relating to current and former petroleum underground storage tanks (USTs) at the site. Based on the available information regarding site operations, Level D protection is recommended for all work activities. However, the level of protection may be upgraded to Level C if applicable conditions within Section 6. of this plan are identified.

2. SITE DESCRIPTION

2.1 Site Location

The Brix Maritime Company facility (the "Site") is located at 9030 NW St. Helens Road, Portland, Oregon, Township 1 North, Range 1 West, Section 11, Tax Lot 800. The Site is bordered to the northeast by the Willamette River, to the southwest by rail road tracks and NW St. Helens Road, to the northwest by a bulk fuel storage facility, and to the southeast by industrial use property.

BRIX 001076

HAI Site Health and Safety Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon Plan Page 2 of 11 HAI Project No. 5074 May 11, 2001

2.2 Site Features

The Site consists of approximately 3.7 acres with two primary structures; an office building and a maintenance building. A "work barge" associated with the property is moored on the Willamette River. The topography at the Site is generally level with elevations of approximately 30 feet above mean sea level (msl) at the southwest property boundary to 20 feet msl at the top of the River bank. The site is generally developed and covered with asphalt, concrete, or buildings with a steep river bank sloping down to the Willamette River. The river bank is protected by rip-rap cover.

2.3 Site History

Information on the site history is included in the Supplemental Preliminary Assessment (XPA) Summary Report¹ prepared by Anchor Environmental LLC for the Site. That XPA, however, contained incomplete information requiring clarification on the ownership and operation of the Site. The property was undeveloped prior to 1979 at which time Brix Maritime Company ("Brix"), a Delaware corporation, developed the property for use as a dispatch and coordination office for a tugboat fleet. In 1993, Brix became a wholly-owned subsidiary of Foss Maritime Company, a Washington corporation. Brix continues to own and operate the facility under a license allowing Brix to use the Foss name. Foss Maritime Company does not own or operate the facility, although the Foss name is displayed at the facility under the license granted to Brix². The facility use has remained the same since site development and is used for tug mooring, maintenance, fueling, and crew rotation.

Two releases of petroleum products have been documented relating to UST systems at the site that were reported under Oregon Department of Environmental Quality (DEQ) leaking UST File No. 26-93-0009. In 1993, a lubricating oil release was reported to the Oregon DEQ relating to a hole discovered in a 30-weight lube oil transfer line next to the UST nest. At that time, soil removal activities were conducted and approximately 60 feet of each of the steel UST product lines was removed and replaced with fiberglass piping. Subsurface investigations conducted in the vicinity of the tank nest detected gasoline, diesel, and oil-range petroleum hydrocarbon impacts. In 1998, USTs No. 1 and No. 2 were decommissioned by removal and USTs No. 3, No. 4, and No. 5, were upgraded. During tank upgrading activities petroleum-impacted soil was encountered, reportedly due to overfill at either UST No. 4 or No. 5; the specific tank or tanks responsible for the overfill was not documented.

BRIX 001077

Anchor Environmental LLC (2000). Supplemental Preliminary Assessment Summary Report, Foss Maritime Company (Brix) Facility, 9030 NW St. Helens Road, Portland, Oregon 97231-1127. October 2000.

² The use of the Foss name under license to Brix caused confusion in the XPA over the ownership and operation of the facility. The facility is operated by Brix and record title to the property comprising the Site remains in Brix's name.

2.4 Constituents of Interest

Waste and/or used oils have not been stored in the USTs at the site. Accordingly, contaminants associated with waste and/or used oils other than petroleum hydrocarbons and constituents are not considered constituents of interest (COIs). COIs relating to USTs containing gasoline, diesel fuel, and lubrication oil are as follows:

- 1) Total petroleum hydrocarbons (TPH) as gasoline, diesel fuel, and oil
- 2) Benzene, toluene, ethylbenzene, and xylene (BTEX)
- 3) Polynuclear aromatic hydrocarbons (PAHs) (including naphthalene)
- 4) Methyltertbutylether (MTBE)
- 5) Ethylene dibromide [1,2-dibromomethane (EDB)] and ethylene dichloride [1,2-dichloroethane (EDC)]
- 6) 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (1,2,4- and 1,3,5-TMB)
- 7) iso-propylbenzene and n-propylbenzene
- 8) Lead

3. ORGANIZATION AND COORDINATION

3.1 Site Personnel/Team Organization

| <u>Team Member</u> | Responsibility Work Zone(s) | |
|--------------------|---|-----|
| | • | |
| Guy Tanz | HAI Project Supervisor, Health and Safety Officer | All |
| Jay Greifer | HAI Field Team Leader, Site Safety Coordinator | All |
| Field Team | Conduct field activities | All |

4. WORK TEAM JOB FUNCTIONS

| Health and Safety Officer | Administer HAI's HASP and ensure HASP, accident |
|---------------------------|---|
| | reports |
| Site Safety Coordinator | Carry out all aspects of HASP, ensure all HAI employees |
| | and subcontractors adhere to HASP |
| Field Team Leader | Supervise, obtain samples, air monitoring, logging |
| Field Team Member(s) | Drilling, surveying, excavating, utility locating |

All personnel arriving or departing the site should log in and out with the Site Safety Coordinator. All activities on site must be cleared through the Project Team Leader.

BRIX 001078

5. SITE CONTROL

- 1) Conduct a daily site safety meeting to discuss each day's planned activities and review the HASP, particularly communications. Additional topics should include:
 - Location of nearest telephone and post the emergency telephone numbers.
 - Location of nearest hospital and post the location.
 - Designation and location of emergency vehicle and location of operating keys.
 - A discussion of any unexpected conditions/hazards (windy conditions etc.).
 - Determine location of support zone and decontamination.
 - A discussion of work zones and any necessary modifications to levels of protection required.
 - Review emergency site egress point(s).
- Maintain access to the site and exclusion zones during the project duration. Exclusion zones should be developed and maintained during the work activities.
- 3) Team members don specified level of protection prior to entering any temporary exclusion zone. The entire decontamination process will be conducted prior to exiting.

6. HAZARD EVALUATION

There are two general forms of hazards expected at the site that include: 1) physical hazards; and 2) chemical hazards.

6.1 Physical Hazards

Physical hazards generally include heavy equipment, vehicles, utilities (overhead and underground), and other hazards such as slip, trip, and fall. It is expected that all of these hazards will likely be present at the site. Personnel at the site should remain aware of such hazards.

BRIX 001079

6.2 Chemical Hazards

Based on previous investigation activities the constituents of potential concern for the site include:

- 1) TPH as gasoline, diesel fuel, and oil
- 2) BTEX
- 3) PAHs
- 4) MTBE
- 5) EDB and EDC
- 6) 1,2,4- and 1,3,5-TMB
- 7) iso- and n-propylbenzene
- 8) Lead

Personnel may be exposed to these constituents during on-site activities.

In general, primary exposure routes of the identified hazards include dermal contact, incidental oral ingestion of contaminant-laden soils and/or dust and inhalation of dust and/or vapors. Material safety data sheets (MSDS) for primary constituents of concern for the site are included in Attachment A. For a summary of symptoms via exposure routes for primary constituents refer to the MSDS sheets.

6.3 Hazard Zone Delineation

Physical hazards are of concern across the entire site and chemical hazards are of concern at the specific areas to be investigated. As such, the entire site is considered to warrant Level D personal protective equipment (PPE) while upgrade to Level C may be warranted under certain conditions at areas of investigation as described in Section 6.

BRIX 001080

7. PERSONAL PROTECTIVE EQUIPMENT

7.1 Basic Equipment and Levels of Protection

Level D: Work coveralls or long pants, steel toe/shank boots, safety glasses, and hard hat

<u>Level C:</u> Level D plus dust resistant Tyvek coveralls, disposable nitrile or vinyl gloves, half-face respirator with appropriate cartridge

HAI does not conduct work in Level A or Level B environments.

Level D PPE can be used when the atmosphere contains no known hazard; oxygen concentrations are not less than 19.5%; and work functions preclude splashes, immersion, or the potential for unexpected inhalation of a contact with hazardous levels of chemicals.

Level C PPE can be used when oxygen concentrations are not less than 19.5 %; atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin; types of air contaminants have been identified, concentrations measured, and a cartridge or canister is available that can remove the contaminant; atmospheric contaminant concentrations do not exceed immediately dangerous to life and health (IDLH) levels; and job functions do not require self-contained breathing apparatus.

Modification of the Level C PPE equipment will be the decision of the Site Safety Coordinator.

7.2 Applicability of Basic PPE and Safety Equipment

| Zone | Level of Protection/PPE | Safety Equipment |
|---|-------------------------|---|
| All areas | Level D | Emergency vehicle first aid kit, blanket, fire extinguisher, mobile telephone, drinking water |
| Exclusion Zone, Contamination- Reduction Zone, Decontamination Lir | Level D | As above, decontamination water, eyewash, tape, extra gloves |

BRIX 001081

Push probe boring installation and sampling activities at most UST investigation sites do not produce levels of blowing dust or volatile aromatic vapors that would create an atmosphere that would warrant upgrade to Level C PPE. Furthermore, based on previous investigations, a maximum concentration of 2,000 parts per million gasoline range hydrocarbons were detected at the site suggesting concentrations of target aromatic compounds are unlikely to be elevated. However, upgrade to Level C PPE will take place when either of the following conditions occur:

- If benzene is identified at a concentration that exceeds the NIOSH Time Weighted Average of 0.1 ppm (Section 11.2)
- If visible air-borne dust is present in work areas of known or suspected TPH, PAH, or lead contamination

8. COMMUNICATION PROCEDURES

- 1) Daily Procedures
 - Prior to beginning daily field activities, a tailgate meeting will be held in the Support/Clean zone to review project status, work objectives, zone delineation, present site conditions, levels of protection, individual team member responsibilities, access and egress points, and decontamination procedures.
- 2) Field Communication Procedures
 - Field activities will be directed using oral communications with appropriate hand signals to be used.
 - A minimum of one cellular phone will be on-site during all field activities and will be designated as the field phone for use by team members.

9. DECONTAMINATION PROCEDURES

- 1) Decontamination Procedures (for personnel, equipment, meters, samples, etc.):
 - Personnel: If disposable booties are worn, these should be discarded; neoprene
 boots should be washed with potable water and trisodium phosphate (TSP) or
 Alconox solution, followed by two separate potable water rinses. Remove tyveks
 and discard. Remove gloves and discard.
- Equipment: All drilling equipment will be steam-cleaned between drilling locations to
 prevent cross-contamination between borings. All soil sampling equipment will be
 decontaminated after each sample by using a detergent solution wash, followed by
 two potable water rinses.

BRIX 001082

• Emergency decontamination will include all of the specified steps to the extent practicable.

2) Material Disposal Methods

- Contaminated Articles: Disposable personnel protective equipment and sampling equipment will be placed in plastic bags and disposed as solid waste. Bags of soiled equipment will not be accessible to the public prior to disposal (to eliminate scavenging of these articles).
- All soil cuttings from push probe and/or soil borings will be placed in 55-gallon drums and characterized to determine appropriate disposal.
- If field indicators do not indicate the presence of a sheen on decontamination and/or purge water, then it will be placed on bare ground for percolation. If sheen is observed then it will be placed in 55-gallon drums and left on site for disposal at a later date. In the event that an oil-water separator is available at the facility, decontamination and/or purge waters will be placed in the unit for treatment.

Note: It is the responsibility of the Site Safety Coordinator to make sure that all pieces of equipment coming off site are properly decontaminated according to the procedures outlined above.

10. SITE SAFETY AND HEALTH

10.1 Designated Site Health and Safety Officers

HAI Site Safety Officer Guy Tanz, Associate (503) 796-0717 gtanz@hahnasoc.com

HAI Health and Safety Officer Dennis Terzian (503) 796-0717 dterzian@hahnasoc.com

11. HAI MAILING ADDRESS

434 NW 6th Avenue, Suite 203 Portland, Oregon 97209 HAI Corporate Management Mr. Roger Brown, Principal (503) 796-0717 rbrown@hahnasoc.com

HAI Site Safety Coordinater
Mr. Jason Greifer, Senior Environmental Scientist
(503) 481-7870 (mobile phone)
jgreifer@hahnasoc.com

BRIX 001083

11.1 Emergency Medical Care

| Entity | Phone or Address |
|-----------------------|--|
| Police | 911 |
| Fire | 911 |
| Paramedic | 911 |
| Hospital | Legacy Good Samaritan Hosipital 1015 NW 22 nd Avenue Portland, OR 97210 (503) 413-8090 Contact: Emergency |
| Poison Control Center | Oregon Poison Center (503) 494-8968 Contact: Emergency |

11.2 Environmental Monitoring

During the investigatory activities at the site, the work zone will be periodically monitored for the presence of volatile aromatic vapors, principally benzene, utilizing a Photovac MicroTip equipped with a photoionization detector and a 10.6 electron volt (eV) lamp. If concentrations of volatile aromatic vapors are detected at total concentrations greater than 0.1 ppm for two consecutive readings, the concentration of benzene will be measured with a multistroke gas sampling pump. If benzene is identified at a concentration that exceeds the NIOSH Time Weighted Average of 0.1 ppm, then work will stop and the PPE will be upgraded to Level C. Additional criteria that would warrant up-grade to Level C PPE include the presence of in work areas of known or suspected TPH, PAH, or lead contamination.

11.3 Work Limitations

- 1) When in Level C, schedule beverage/rest breaks of a minimum of 15 minutes in a shaded area every 2 hours when ambient temperature exceeds 75° F. When ambient temperatures exceed 80° F, provide a beverage/rest breaks of a minimum of 15 minutes in a shaded area every 1 1/2 hours.
- 2) Work will be performed only during daylight hours unless adequate lighting is provided.
- 3) No eating, drinking, or smoking within contamination zones.

BRIX 001084

- 4) No facial hair is acceptable that would interfere with respirator fit.
- 5) No contact lenses on site.
- 6) Buddy system at all times in contamination zone (visual/voice contact).

11.4 Emergency Procedures

1) Basic Procedures

Stabilize injured person and remove from contamination zone, following the decontamination procedures as much as practicable

Notify the Site Safety Coordinator

The Site Safety Coordinator will direct activities during a medical emergency.

Initiate first aid and immediately get medical attention for the injured party.

Depending upon the type and severity of the injury, call the appropriate emergency response agency.

Notify the health and safety officer and HAI Corporate Management.

Prepare an incident report. The HAI Health and Safety Officer is responsible for ensuring its preparation and submittal to the health and safety officer and HAI Corporate Management within 48 hours.

2) Site-specific Instructions

Acute exposure to hazardous materials:

Dermal: Wash exposed skin areas with clean water and reassess personnel protective equipment to include adequate splash protection. Call physician when exposure is suspected.

Eye: Wash eye for 15 minutes with clean water and get immediate medical attention. Do not delay eyewash for any reason.

Inhalation: Move exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible.

BRIX 001085

HAI Site Health and Safety Brix Maritime Company Facility 9030 NW St. Helens Road Portland, Oregon Plan Page 11 of 11 HAI Project No. 5074 May 11, 2001

| Directions to H | lospital |
|-----------------------------------|----------|
|-----------------------------------|----------|

From the site, go south NW St. Helens Highway, stay right at intersection of NW Yeon and St. Helens Highway, turn right on NW Wardway, follow street until it turns into NW Vaughn Street, turn right on NW 23rd Avenue, proceed to emergency entrance on left at NW Marshall Street, Legacy Good Samaritan Hospital emergency is located at approximately 1015 NW 23rd Avenue. A map from the site to the hospital is in Attachment B.

12. PLAN APPROVAL

This Site Health and Safety Plan has been written for the use of HAI, its employees, and subcontractors. HAI claims no responsibility for its use by others. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

| | - · · · · · · · · · · · · · · · · · · · | | |
|-----------------|---|------------|-------------------------------|
| Plan Prepared I | Ву: | Da | ate: |
| Plan Reviewed | by: | D: | ate: |
| | an: Manager/Site Safety Co and Safety Officer | oordinator | |
| 13. SIGNATURE | S | | |
| | onnel have read the about initiating work at the S | | with its provisions, and will |
| Name | Signature | Date | Company |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Hahn and Associates, Inc.

GLOSSARY OF ABBREVIATIONS

| CFR | Code of Federal Regulations |
|------|---|
| HAI | Hahn and Associates, Inc. |
| IDLH | Immediately Dangerous to Life or Health |
| MSDS | material safety data sheets |
| OSHA | Occupational Safety and Health Administration |
| PPE | personal protective equipment |
| RCRA | Resource Conservation and Recovery Act |
| TSP | trisodium phosphate |
| TWA | 8-hour Time Weighted Average |

BRIX 001087

ATTACHMENT A

Material Data Safety Sheets

TEXACO REFINING AND MARKETING, -- 00351 UNLEADED REGULAR GASOLINE (26000 UNLEADE

MSDS Safety Information

FSC: 9130

NIIN: 00-148-7102 MSDS Date: 05/19/1997

MSDS Num: CHKWR

Product ID: 00351 UNLEADED REGULAR GASOLINE (26000 UNLEADED REG GASOLINE)

MFN: 01

Responsible Party

Cage: 2R503

Name: TEXACO REFINING AND MARKETING, INC

Box: 7812

City: UNIVERSAL CITY CA 91608-4427

Info Phone Number: 800-782-7852/914-838-7204 (#4;MSDS)

Emergency Phone Number: 914-831-3400/800-424-9300 (CHEMIREC)

Review Ind: Y Published: Y

Preparer Co. when other than Responsible Party Co.

Cage: 2R503

Name: TEXACO REFINING AND MARKETING INC

Address: 1111 RUSK ST

City: HOUSTON TX 77002-3310

Contractor Summary

Cage: 7B131
Name: TEXACO INC
Address: UNKNOWN

Box: 509

City: BEACON NY 12508-0509

Phone: 914-831-3400

Cage: 2R503

Name: TEXACO REFINING AND MARKETING INC

Address: 1111 RUSK ST

City: HOUSTON TX 77002-3310

Phone: 713-650-5206

Item Description Information

Item Name: GASOLINE, AUTOMOTIVE Specification Number: ASTM D4814

Type/Grade/Class: CL A, B, C, D, E, SPEC GR

Unit of Issue: GL

UI Container Qty: BULK GALLON Type of Container: UNKNOWN

Ingredients

BRIX 001089

http://hazard.com/msds2/f/97/chkwr.html

Page 1 of 8

Cas: 8006-61-9 RTECS #: LX3300000

Name: GASOLINE CONSISTS OF STRAING/BRANCHED PARAFFINIC

HYDROCARBONS, OLEFINS, CYLCOPARAFFIN, AROMATICS. 95.00-99.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 300 PPM

ACGIH TLV: 300 PPM/500STEL;9596

Name: OXYGENATES, MAY OR MAY NOT CONTAIN ANY COMBINATION OF THESE

OXYG:MTBE, ETBE, TAME &/OR ETOH IN RANGE OF 0-20%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: NOT ESTABLISHED

Cas: 1634-04-4 RTECS #: KN5250000

Name: METHYL TERT-BUTYL EIHER (SARA 313) (CERCLA), 10.00-19.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: 40 PPM, A3; 9596

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

Cas: 637-92-3 RTECS #: KN4730200

Name: ETHYL-T-BUTYL ETHER, 10.00-19.99%

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: NOT ESTABLISHED

Cas: 994-05-8 RTECS #: 1007422AM

Name: TERT-AMYL METHYL ETHER, 10.00-19.99%

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: NOT ESTABLISHED

Cas: 64-17-5

RTECS #: KQ6300000

Name: ETHYL ALCOHOL (ETHANOL), 3.00-9.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 1000 PPM

ACGIH TLV: 1000 PPM; 9596

Cas: 1330-20-7

RTECS #: ZE2100000

Name: XYLENES (O-,M-,P- ISOMERS) (SARA 313) (CERCLA), 3.00-9.99%.

용 Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 100 PPM

ACGIH TLV: 100 PPM/150STEL;9596

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 108-88-3 RTECS #: XS5250000

Name: TOLUENE (SARA 313) (CERCLA), 3.00-9.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 200 PPM; Z-2 ACGIH TLV: S, 50 PPM; 9596

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 71-43-2

RTECS #: CY1400000

Name: BENZENE (SARA 313) (CERCLA), 1.00-2.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: SEE 1910.1028 ACGIH TLV: 10 PPM; A2; 9596

EPA Rpt Qty: 10 LBS DOT Rpt Qty: 10 LBS

Cas: 95-63-6

RTECS #: DC3325000

Name: 1,2,4-TRIMETHYLBENZENE (SARA 313), 1.00-2.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 25 PPM

ACGIH TLV: 25 PPM; 9596

Cas: 110-54-3

RTECS #: MN9275000

Name: HEXANE (N-HEXANE) (CERCLA), 1.00-2.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 500 PPM

ACGIH TLV: 50 PPM; 9596

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

Cas: 100-41-4 RTECS #: DA0700000

Name: ETHYL BENZENE (SARA 313), 1.00-2.99%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

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OSHA PEL: 100 PPM

ACGIH TLV: 100 PPM/125STEL;9596

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Health Hazards Data

LD50 LC50 Mixture: ORAL LD50 (RAT) >5.00 G/KG.

Route Of Entry Inds - Inhalation: YES

Skin: YES Ingestion: NO

Carcinogenicity Inds - NTP: YES

IARC: YES OSHA: YES

Effects of Exposure: EYE:MAY CAUSE IRRIT, EXPERIENCE MILD DISCOMFT, SLIGHT EXCESS REDNESS.SKIN:BRIEF CONTACT MAY CAUSE SLIGHT IRRIT.PROLONG CONTACT MAY CAUSE MORE SEVERE IRRIT, DISCOMFT, LOCAL REDNESS, SWELLING.PROL/WIDEPSREAD/REP CONTACT MAY RESULT IN ABSORPT OF PO T HARMFUL AMTS OF MATL.INHAL:VAP/MIST IRRIT NOSE/THROAT.INGEST:MORE THAN (SUPPL)

Explanation Of Carcinogenicity: PER MSDS:PRODUCT &/OR COMPONENET(S)
CARCINOGENIC ACCORDING TO OSHA/IARC/NTP/OTHER. BENZENE. CA PROP 65.

Signs And Symptions Of Overexposure: INHAL:DIZZ,DROWS,EUPHORIA,LOSS OF COORD,DISORIENT,HEAD,NAU,VOMIT.POORLY VENTI AREA/CONF SPACE UNCONSC,ASPHYXIATION.PROL/REP OVEREXPO ABSORPT OF POT HARMFUL AMIS OF MATL.SEE HEALTH HAZ ABOVE.CHRONIC:PROL/REP ETHANOL VAP EXPO-HEAD,LACK OF COORD,SLEEPINESS,FTG,DIFF CONC.CHRONIC ALCOHOLIC BEV-LIVER/STOM/HEART/NERV SYS DMG.

Medical Cond Aggravated By Exposure: BECAUSE OF ITS IRRIT PROPERTIES, REPEATED SKIN CONTACT MAY AGGRAVATE EXISTING DERM(SKIN CONDITION).

First Aid: EYE:IMMED FLUSH W/LOTS OF H2O @LEAST 15MINS, HOLD EYELIDS APART.GET MED ATTN.SKIN:WASH W/LOTS OF SOAP/H2O SEVERAL MINS.IRRIT DVLPS/PERSIST GET MED ATTN.INGEST:CONSC/CAN SWALLO GIVE 2GLASSES H2O(16OZ), DONT INDUCE VOMIT.VOMIT OCCURS GIVE FLUID S AGAIN.DETERMINE STOMAC EVACUATION/VOMIT INDUCTION BY MED PERSONNEL.DONT GIVE ANYTHING BY MOUTH IF UNCONSC/CONVULS.INHAL:MOVE TO FRESH AIR.NOT BREATH/RESP(SUP)

Handling and Disposal

Spill Release Procedures: REMOVE ALL IGN SOURCE INCLUDE INTERNAL COMBUST ENGINES/POWER TOOLS.VENTI AREA.BARRICADE AREA.STAY UPWIND, WARN OF POSSIBLE DOWNWIDE EXPLO HAZ.AVOID BREATH VAP/SKIN/EYE/CLOTH CONTACT.PRESSURE DEMAND AIR SUP RESP-CONTAM/OXY UNK CONC.PPE.>714LB S SARA 304

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: MATL PRESENTLY CONSTITUTED HAS RCRA CLASSIF OF BENZENE TOXIC/IGN.DISCARD IN PRESENT FORM HAZ WASTE D018/D001.RCRA-USER RESPON TO DETERMINE WHETHER PROD MEETS RCRA CRITERIA FOR HAZ WASTE @DISPO TIME.USE/TRANSFORM/MIX/ETC CHANGE CLASSIF.DONT (OTH PREC)

Handling And Storage Precautions: MATL MAY BE @ELEVATED TEMP &/OR PRESSURES.EXERCISE ARE WHEN OPN BLEEDERS/SMPL PORTS.GROUND/BOND SHIP CNINR, TRANSF LINE, REC CNINR.

Other Precautions: KEEP AWAY FRM HEAT/SPARK/FLAME/OTHER IGN SOURCES.PRODINIENDED FO9R USE AS MOTOR FUEL ONLY.USE NONSPARK

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TOOLS, GROUND/BOND ALLCNINGS. DISPO:ALLOW TO ENTER DRAIN/SEWER.CAN CAUSE EXPLO.CONTAINS SEC 313TOXIC CHEM/CERCLA 102 CHEMS.

Fire and Explosion Hazard Information

Flash Point Method: PMCC Flash Point: =-40.C, -40.F

Lower Limits: 1.4 Upper Limits: 7.6

Extinguishing Media: H2O INEFFECTIVE ON FLAMES.USE WATER SPRAY, DRY

CHEMICAL, ALCOHOL RESISTANT FOAM, CO2 TO EXTINGUISH FIRE.

Fire Fighting Procedures: H2O SHOULD BE USED TO COOL FIRE-EXPO CNINR/PROVIDE PROTECTION FOR PERSONS ATTEMPTING TO STOP LEAK.WEAR FULL PROTECTIVE CLOTH & POSITIVE PRESSURE BREATH APPARATU

Unusual Fire/Explosion Hazard: VAP HEAVIER THAN AIR, TRAVEL CONSIDERABLE
DISTANCE TO IGN SOURCE-FLASHBK.FLOWING MATL GENERATE STATIC ELECT, CAUSE FIRE
EXPO W/SPARK IN FLAM VAP-AIR ATM.EXT FLAMM

Control Measures

Respiratory Protection: AIRBORNE CONC SHOULD BE KEPT TO LOWEST LEVELS POSSIBLE.VAP/MIST/DUST GENERATED & OCCUPAT EXPO LIMIT OF PROD/COMPO EXCEEDED USE APPRO NIOSH/MSHA APPROV AIR PURIFY/AIR SUPPL RES AFT DETERM AIRBORNE CONTAM CONC.AIR SUPPL RES-CONTAM CON/OXY UNK

Ventilation: EXPLO-PROOF EQPMT-MAINTAIN ADEQ VENTI TO MEET OCCUP EXPLIMITS.PREVENT EXPO AIR-GAS MIX ACCUMM, AVOID SIGN OXY DISPLACE.

Protective Gloves: NITRILE RUBB, TEFLON, VITRON-RESIST TO PET

Eye Protection: SAF GLASSES, CHEM TYP GOGG, FCSHIELD

Other Protective Equipment: PROTECGIVE CLOTH-COVERALLS, BOOTS.OXY LEVELS SHOULD BE @LEAST 19.5% IN CONFINE SPACE/OTHER WORKAREA.

Work Hygienic Practices: REMOVE/DRY CLEAN (MORE EFFECTIVE) /LAUNDER CLOTH SOAK/SOIL W/MATL BEF REUSE.INFORM CLOTH CLEANERS OF POT HAZ W/CONTAM CLOT Supplemental Safety and Health: HEALTH: SEVERAL MOUTHFULS SWALLOW ABD DISCOMFT, NAU, DIARR MAY OCCUR. ASPIRATION MAY OCCUR DURING SWALLO/VOMIT RESULT IN LUNG DMG. 1STAID: DISTRESS CLEAR AIRWAY, START ART RESP. W/DR ADVICE GIVE SUPPL OXY W/BAG-VALV MASK/MANUAL TRIG OXY SUPPLY.STO MACH EVAC-USE METHOD LEAST LIKELY TO CAUSE ASPIRATION. DISPO: ENTER DRAIN/SEWERS.

Physical/Chemical Properties

HCC: F1

Boiling Point: >32.2C, 90.F

Vapor Pres: 300-700 Vapor Density: 3-4 Spec Gravity: 0.7-0.77

PH: NA

Evaporation Rate & Reference: NONE SPECIFIED BY MANUFA.

Solubility in Water: 0.1-1, SLIGHT

Appearance and Odor: LIGHT RED TO LIGHT STRAW LIQUID, PETROLEUM ODOR

Reactivity Data

Stability Condition To Avoid: HEAT, IGN SOURCES. Materials To Avoid: HEAT, STRONG OXIDIZERS Hazardous Decomposition Products: TOXIC LEVELS OF CARBON MONOXIDE, CARBON DIOXIDE, IRRIT ALDEHYDES & KETONES. Hazardous Polymerization Indicator: NO ______ Toxicological Information Ecological Information MSDS Transport Information Regulatory Information Other Information Transportation Information Responsible Party Cage: 2R503 Trans ID NO: 50948 Product ID: 00351 UNLEADED REGULAR GASOLINE (26000 UNLEADED REG GASOLINE) MSDS Prepared Date: 05/19/1997 Review Date: 07/15/1998 MFN: 1 Net Unit Weight: 5.8 LBS Multiple KIT Number: 0 Review IND: Y Unit Of Issue: GL Container OTY: BULK GALLON Type Of Container: UNKNOWN Additional Data: PER MSDS:DOT PROPER SHIPPING NAME:GASOLINE, HAZ CLASS 3, UN1203, PKG II, FLAMM LIO LABEL. Detail DOT Information ______ DOT PSN Code: GIN DOT Proper Shipping Name: GASOLINE Hazard Class: 3 UN ID Num: UN1203 DOT Packaging Group: II Label: FLAMMABLE LIQUID Special Provision: B33,B101,T8 Non Bulk Pack: 202 Bulk Pack: 242

BRIX 001094

Max Qty Pass: 5 L Max Qty Cargo: 60 L Vessel Stow Req: E Untitled 4/19/01 11:47 AM

Detail IMO Information

IMO PSN Code: HRV

IMO Proper Shipping Name: GASOLINE

IMDG Page Number: 3141

UN Number: 1203 UN Hazard Class: 3.1 IMO Packaging Group: II Subsidiary Risk Label: -

EMS Number: 3-07

MED First Aid Guide NUM: 311

Detail IATA Information

IATA PSN UC

IATA UN ID Num: 1203

IATA Proper Shipping Name: GASOLINE

IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID

UN Packing Group: II

Packing Note Passenger: 305

Max Quant Pass: 5L Max Quant Cargo: 60L Packaging Note Cargo: 307

Exceptions: A100

Detail AFI Information

AFI PSN UC

AFI Proper Shipping Name: GASOLINE

AFI Hazard Class: 3
AFI UN ID NUM: UN1203
AFI Packing Group: II
Special Provisions: P5
Back Pack Reference: A7.3

HAZCOM Label

Product ID: 00351 UNLEADED REGULAR GASOLINE (26000 UNLEADED REG GASOLINE)

Cage: 2R503

Company Name: TEXACO REFINING AND MARKETING INC

Street: 1111 RUSK ST City: HOUSTON TX Zipcode: 77002-3310

Health Emergency Phone: 914-831-3400/800-424-9300(CHEMIREC)

Label Required IND: Y

Date Of Label Review: 07/15/1998

Status Code: C

Label Date: 07/15/1998

Origination

Chronic Hazard IND: Y

Eye Protection IND: YES Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection IND: YES

Health Hazard: Moderate Contact Hazard: Moderate

Fire Hazard: Severe Reactivity Hazard: None

Hazard And Precautions: EXTREMELY FLAMM LIQ/VAP.VAP CAN CAUSE FLASH FIRE.MAY CAUSE DIZZ/DROWS.MAY CAUSE EYE IRRIT.ASPIRATION HAZ IF INGEST.CAN ENTER LUNGS, CAUSE DMG.ATIN: POSSIBLE CANC HAZ-MAY CAUSE CANC BASED ON ANIMAL DATA.1STAID: EYE: IMMED FLUSH W/LOTS OF H2O @LE AST 15MINS, HOLD EYELIDS APART.GET MED ATIN.SKIN: WASH W/LOTS OF SOAP/H2O SEVERAL MINS.IRRIT DVLPS/PERSIST GET MED ATIN.INGEST: CONSC/CAN SWALLO GIVE 2GLASSES H2O (16OZ), DONT INDUCE VOMIT.VOMIT OCCURS GIVE FLUIDS AGAIN.DETERMINE STOMAC EVACUATI ON/VOMIT INDUCTION BY MED PERSONNEL.DONT GIVE ANYTHING BY MOUTH IF UNCONSC/CONVULS.INHAL: MOVE TO FRESH AIR.NOT BREATH/RESP/SUPPL OXY.TARGET ORGANS: LUNGS, EYE, CNS.

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TOTAL PETROLEUM INC

-- REGULAR GASOLINE (LEADED)

MSDS Safety Information

FSC: 9130

NIIN: 00-264-6215 MSDS Date: 01/01/1994

MSDS Num: BWCBT

Product ID: REGULAR GASOLINE (LEADED)

MFN: 01

Responsible Party

Cage: 6G102

Name: TOTAL PETROLEUM INC Address: EAST SUPERIOR STREET

City: ALMA MI 48802

Info Phone Number: 517-463-1164

Emergency Phone Number: 517-463-1164

Preparer's Name: J.M.KAZARIAN

Review Ind: Y Published: Y

Contractor Summary

Cage: 6G102

Name: TOTAL PETROLEUM INC Address: EAST SUPERIOR STREET

City: ALMA MI 48801 Phone: 517-463-1164

Item Description Information

Item Manager: S9F

Item Name: GASOLINE, AUTOMOTIVE Specification Number: VV-G-1690

Type/Grade/Class: REGULAR

Unit of Issue: DR

Quantitative Expression: 0000000054GL

UI Container Qty: 54 GALLONS Type of Container: DRUM, 18 GA

Ingredients

Cas: 8006-61-9 RTECS #: LX3300000

Name: GASOLINE (CONTAINS THE FOLLWING INGREDIENTS:)

% Wt: 100

Other REC Limits: 500 PPM MFR OSHA PEL: 300 PPM/500 STEL ACGIH TLV: 300 PPM/500STEL;9293

Cas: 71-43-2

BRIX 001097

http://hazard.com/msds2/f/94/bwcbt.html

RTECS #: CY1400000

Name: BENZENE (SARA III),

용 Wt: <3

Other REC Limits: NONE RECOMMENDED OSHA PEL: 1PPM/5STEL;1910.1028 ACGIH TLV: 10 PPM; A2; 9293

EPA Rpt Qty: 10 LBS DOT Rpt Qty: 10 LBS

Cas: 100-41-4 RTECS #: DA0700000

Name: ETHYL BENZENE (SARA III)

용 Wt: <1.5

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 100 PPM/125 STEL

ACGIH TLV: 100 PPM/125STEL 9293

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 106-42-3

RTECS #: ZE2625000

Name: P-XYLENE (P-DIMETHYLBENZENE) (SARA III),

% Wt: <1.5

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 100 PPM/150 STEL

ACGIH TLV: 100 PPM/150STEL;9293

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 108-38-3 RTECS #: ZE2275000

Name: M-XYLENE (M-DIMETHYLBENZENE) (SARA III)

% Wt: <3.5

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 100 PPM/150 STEL

ACGIH TLV: 100 PPM/15OSTEL;9293

EPA Rot Qty: 1000 LBS DOT Rot Qty: 1000 LBS

Cas: 95-47-6

RTECS #: ZE2450000

Name: O-XYLENE (O-DIMETHYLBENZENE) (SARA III),

% Wt: <1.5

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 100PPM/150 STEL

ACGIH TLV: 100 PPM/150STEL;9293

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 95-63-6

RTECS #: DC3325000

Name: 1,2,4-TRIMETHYLBENZENE (SARA III)

8 Wt: 3

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 25 PPM

ACGIH TLV: 25 PPM; 9293

Cas: 108-88-3 RTECS #: XS5250000

Name: TOLUENE (SARA III)

% Wt: <5.8

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 200 PPM/150 STEL ACGIH TLV: 50 PPM; 9293 EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 109-66-0 RTECS #: RZ9450000

Name: PENTANE

% Wt: <3

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 1000 PPM/750 STEL ACGIH TLV: 600 PPM/750STEL;9293

Cas: 110-54-3 RTECS #: MN9275000

Name: HEXANE (N-HEXANE)

୫ Wt: <3

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 500 PPM

ACGIH TLV: 50 PPM; 9293

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

RTECS #: 1002929HI

Name: HEXANE ISOMERS (OTHER THAN N-HEXANE)

용 Wt: <10

Other REC Limits: NONE RECOMMENDED

OSHA PEL: 500 PPM/1000 STEL. ACGIH TLV: 500 PPM/1000 STEL.

Health Hazards Data

LD50 LC50 Mixture: LD50 (ORAL RAT) IS UNKNOWN

Route Of Entry Inds - Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Inds - NTP: NO

IARC: YES OSHA: NO

Effects of Exposure: ACUTE-CENTRAL NERVOUS SYSTEM DEPRESSION, PERIPHERAL NERVOUS SYSTEM DEPRESSION, NARCOSIS, ASPHYXIATION, G/I DISTURBANCES, AND EYE & SKIN IRRITATION. CHRONIC-DERMATITIS, PNEUMONITIS, PULMONARY EDEMA,

& KIDNEY DAMAGE.

Explanation Of Carcinogenicity: IARC HAS DETERMINED THAT GASOLINE IS POSSIBLY CARCINOGENIC TO HUMANS BECAUSE IT CONTAINS BENZENE.

Signs And Symptions Of Overexposure: HEADACHE, DROWSINESS, EYE RESPIRATORY & SKIN IRRITATION, NAUSEA, NUMBNESS.

Medical Cond Aggravated By Exposure: NO INFORMATION GIVEN BY MFR ON MSDS.

First Aid: REMOVE FROM CONTAMINATED ATMOSPHERE. IF NOT BREATHING, ADMINISTER ARTIFICIAL RESPIRATION. REMOVE CONTMINATED CLOTHING. FLUSH AFFECTED AREAS THOROUGHLY WITH WATER. IF SWALLOWED, DO NOT INDUCE VOMITING. SEEK MEICAL ATTENTION IMMEDIATELY.

Handling and Disposal

Spill Release Procedures: ELIMINATE ALL SOURCES OF IGNITION. CONTAIN WITH EARTHEN DIKE OR PETROLEUM ABSORBENT MATERIAL. REMOVE WITH GROUNDED SUCTION PUMP TO SALVAGE CONTAINER. REMOVE ALL CONTAMINATED MATERIALS.

Neutralizing Agent: NO INFORMATION GIVEN BY MFR ON MSDS.

Waste Disposal Methods: PER FEDERAL, STATE AND LOCAL LAWS.

Handling And Storage Precautions: KEEP AWAY FROM ALL IGNITION WOURCES (E.G. HEAT, FLAME, SPARKS, STRONG OXIDIZERS). BOND AND GROUND CONTAINER. STORE IN SAFETY CONTAINERS.

Fire and Explosion Hazard Information

Flash Point Method: PMCC

Flash Point Text: <-40F,<-40C

Lower Limits: 1.3 Upper Limits: 6.0

Extinguishing Media: USE DRY CHEMICAL, FOAM OR CARBON DIOXIDE.

Fire Fighting Procedures: SELF-CONTAINED BREATHING APPARATUS MAY BE REQUIRED. Unusual Fire/Explosion Hazard: EXPLOSION HAZARD SHEN EXPOSED TO HEAT OR FLAME. VAPOR IS HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION & FLASHBACK.

Control Measures

Respiratory Protection: ORGANIC VAPOR CARTRIDGE OR SUPPLIED AIR RESPIRATOR APPROVED BY NIOSH.

Ventilation: USE LOCAL EXHAUST TO CONTROL VAPORS. USE MECHANICAL VENTILATION FOR CONFINED SPACES. USE EXPLOSION PROOF EQUIPMENT.

Protective Gloves: PVC OR EQUIVALENT RESISTANT GLOVE

Eye Protection: CHEMICAL GOGGLES OR FACE SHIELD

Other Protective Equipment: PVC OR EQUIVALENT CLOTHING IF SPLASHING IS LIKELY.

Work Hygienic Practices: KEEP BODY CONTACT & SPLASH TO A MINIMUM.

Supplemental Safety and Health: NONE

Physical/Chemical Properties

HCC: F2

NRC/State LIC No: NONE Net Prop WT For Ammo: NONE

B.P. Text: <100F, <38C

Decomp Text: UNKNOWN
Vapor Pres: 400-900 MM
Vapor Density: 3-4

Spec Gravity: 0.65 - 0.75 Solubility in Water: INSOLUBLE

Appearance and Odor: LIGHT ORANGE OR BRONZE LIQUID, CHARACTERISTIC GASOLINE

ODOR.

Corrosion Rate: UNKNOWN

Reactivity Data

Stability Indicator: YES

Stability Condition To Avoid: HEAT, FLAMES

Materials To Avoid: OXIDIZERS

Hazardous Decomposition Products: CARBON MONOXIDE, LEAD OXIDES AND OTHER

PETROLEUM DECOMPOSITION PRODUCTS
Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: WILL NOT OCCUR.

Toxicological Information

Ecological Information

MSDS Transport Information

Regulatory Information

Other Information

Transportation Information

Responsible Party Cage: 6G102

Trans ID NO: 63151

Product ID: REGULAR GASOLINE (LEADED)

MSDS Prepared Date: 01/01/1994

Review Date: 12/31/1994

MFN: 1

Multiple KIT Number: 0

Review IND: Y Unit Of Issue: DR

Container QTY: 54 GALLONS

Type Of Container: DRUM, 18 GA

Detail DOT Information

DOT PSN Code: GIN

DOT Proper Shipping Name: GASOLINE

Untitled 4/19/01 11:47 AM

Hazard Class: 3 UN ID Num: UN1203

DOT Packaging Group: II Label: FIAMMABLE LIQUID

Special Provision: B33,B101,T8

Non Bulk Pack: 202 Bulk Pack: 242 Max Qty Pass: 5 L Max Qty Cargo: 60 L Vessel Stow Req: E

Detail IMO Information

IMO PSN Code: HRV

IMO Proper Shipping Name: GASOLINE

IMDG Page Number: 3141

UN Number: 1203 UN Hazard Class: 3.1 IMO Packaging Group: II Subsidiary Risk Label: -

EMS Number: 3-07

MED First Aid Guide NUM: 311

Detail IATA Information

IATA PSN UC

IATA UN ID Num: 1203

IATA Proper Shipping Name: GASOLINE

IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID

UN Packing Group: II

Packing Note Passenger: 305

Max Quant Pass: 5L Max Quant Cargo: 60L Packaging Note Cargo: 307

Exceptions: A100

Detail AFI Information

AFI PSN UC

AFI Proper Shipping Name: GASOLINE

AFI Hazard Class: 3
AFI UN ID NUM: UN1203
AFI Packing Group: II
Special Provisions: P5
Back Pack Reference: A7.3

HAZCOM Label

Product ID: REGULAR GASOLINE (LEADED)

Cage: 6G102

Company Name: TOTAL PETROLEUM INC

Street: EAST SUPERIOR STREET

City: ALMA MI Zipcode: 48801

Health Emergency Phone: 517-463-1164

Label Required IND: Y

Date Of Label Review: 12/31/1994

Status Code: C
MFG Label NO: NONE
Label Date: 12/31/1994
Origination Code: F
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: DANGER

Respiratory Protection IND: YES

Health Hazard: Slight Contact Hazard: Slight Fire Hazard: Severe Reactivity Hazard: None

Hazard And Precautions: **TARGET ORGANS:SKIN, EYES, RESPIRATORY SYSTEM, CNS**
ACUTE-CENIRAL NERVOUS SYSTEM DEPRESSION, PERIPHERAL NERVOUS SYSTEM
DEPRESSION, NARCOSIS, ASPHYXIATION, G/I DISTURBANCES, AND EYE & SKIN
IRRITATION. CHRONIC-DERMATITIS, PNEUMONITIS, PU LMONARY EDEMA, & KIDNEY
DAMAGE. KEEP AWAY FROM ALL IGNITION WOURCES (E.G. HEAT, FLAME, SPARKS, STRONG
OXIDIZERS). BOND AND GROUND CONTAINER. STORE IN SAFETY CONTAINERS. IN CASE OF
SPILL: ELIMINATE ALL SOURCES OF IGNITION. CONTAIN WITH EARTH EN DIKE OR
PETROLEUM ABSORBENT MATERIAL. REMOVE WITH GROUNDED SUCTION PUMP TO SALVAGE
CONTAINER. REMOVE ALL CONTAMINATED MATERIALS.

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TEXACO REFINING & MARKETING, I -- 26120 DIESEL 2 FUEL

MSDS Safety Information

FSC: 9140

NIIN: 00-286-5295 MSDS Date: 12/08/1995

MSDS Num: CDYFD

Product ID: 26120 DIESEL 2 FUEL

MFN: 01

Responsible Party

Cage: 2R503

Name: TEXACO REFINING & MARKETING, INC

Box: 7812

City: UNIVERSAL CITY CA 91608

Info Phone Number: 914-838-7336/914-838-7204

Emergency Phone Number: 800-424-9300 (CHEMIREC) / 914-831-3400

Preparer's Name: TEXACO INC

Review Ind: Y Published: Y

Preparer Co. when other than Responsible Party Co.

Cage: 2R503

Name: TEXACO REFINING AND MARKETING INC

Address: 1111 RUSK ST

City: HOUSTON TX 77002-3310

Contractor Summary

Cage: 2R503

Name: TEXACO REFINING AND MARKETING INC

Address: 1111 RUSK ST

City: HOUSTON TX 77002-3310

Phone: 713-650-5206

Item Description Information

Item Name: DIESEL FUEL

Specification Number: A-A-52557 Type/Grade/Class: DF-2 GRADE

Unit of Issue: DR

Quantitative Expression: 0000000005GL

UI Container Qty: 5 GALLONS

Type of Container: CAN

Ingredients

Cas: 98-82-8

RTECS #: GR8575000

Name: CUMENE (SARA 313) (CERCLA), 0.01-0.09%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: S, 50 PPM

ACGIH TLV: S, 50 PPM; 9596

EPA Rpt Qty: 5000 LBS DOT Rpt Qty: 5000 LBS

Cas: 71-43-2

RTECS #: CY1400000

Name: BENZENE (SARA 313) (CERCLA), 0.01-0.09%.

% Wt: SEE ING

Other REC Limits: NONE RECOMMENDED

OSHA PEL: SEE 1910.1028 ACGIH TLV: 10 PPM; A2; 9596

EPA Rpt Qty: 10 LBS DOT Rpt Qty: 10 LBS

RTECS #: 1010885HC

Name: COMPLEX MIXIURE OF HYDROCARBONS PRODUCED BY CRUDE OIL DISTILLATION,

C9-C20, 325-675F BOILING RANGE. (INCLUDES INGRED #4)

% Wt: 100.00

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: NOT ESTABLISHED

RTECS #: 1010360HC

Name: HYDROTREAT/HYDROSULFURIZE PROD CONTAINS HYDROCARBONS FROM DISTILALITION OF

CATALYTIC CRACKING (BICYCLIC, TRICYCLIC AROMATI)

% Wt: SEE #2

Other REC Limits: NONE RECOMMENDED

OSHA PEL: NOT ESTABLISHED ACGIH TLV: NOT ESTABLISHED

Health Hazards Data

LD50 LC50 Mixture: ORAL LD50 RAT 9.00ML/KG-PRACT NON-TOXIC

Route Of Entry Inds - Inhalation: YES

Skin: YES
Ingestion: NO

Carcinogenicity Inds - NTP: NO

IARC: NO OSHA: NO

Effects of Exposure: MAY CAUAES DIZZ, DROWS, SKIN IRRIT, EYE IRRIT. ASPIRATION HAZ IF INGEST-CAN ENTER LUNGS/CAUSE DMG. CONTAINS MIDDLE DISTILLATES SHICH MAY CAUSE CANC BASED ON ANIMAL DATA. ACUTE: EYE IRRIT, EXPERIENCED AS MILD DISCOMFT, SLIGHT EXCESS REDNESS. SKIN: SEVE RE IRRIT W/PAIN, SEVERE EXCESS

REDNESS/SWELLING W/CHEM BURNS, BLISTER FORM (SUPPL)

Explanation Of Carcinogenicity: PER MSDS:PROD &/OR COMPO CARC ACCORDING TO:OIHER & CA PROP 65. :CONTAINS BENZENE(0.01-0.09%)-CARC.

Signs And Symptions Of Overexposure: EYE:IRRIT,MILD DISCOMFT,SLIGHT EXCESS REDNESS.SKIN:SEVERE IRRIT,PAIN,SEVERE EXCESS REDNESS,SWELLING W/CHEM BURNS,BLISTER FORMATION,TISSUE DESTRUCTION.INHAL:IRRIT

http://hazard.com/msds2/f/95/cdyfd.html

NOSE/THROAT, DIZZ, DROWS, EUPHORIA, LOSS OF

COORDINITATION, DISORIENTATION, HEAD, NAU, VOMIT, UNCONSC, ASPHYXIATION. INGEST: ADB DISCOMFT, NAU, DIARR, ASPIRATION-LUNG DMG.

Medical Cond Aggravated By Exposure: SKIN CONTACT MAY AGGRAVATE EXISTING DERMITTIS (SKIN CONDITON).

First Aid: EYE:IMMED FLUSH W/PLENTY OF WATER FOR @LEAST 15MINS.HOLD EYELIDS APART.GET MED ATTN.SKIN:IMMED REMOVE CONTAM CLOTH/SHOES.SFETY SHOWER FLUSH WELL W/LG AMTS OF RUNNING WATER FOR @LEAST 15MINS.DONT NEUTRALIZE W/CHEM AGENTS.GET MED ATTN IMMED.I NGEST:CONSC/CAN SWALLOW GIVE 2 GLASSES OF WATER(160Z).DONT INDUCE VOMIT.VOMIT OCCURS GIVE FLUIDS AGAIN.SEE MED PERSONNEL REFER TO VOMIT.INHAL:MOVE TO FRESH(SUP)

Handling and Disposal

Spill Release Procedures: VENTI AREA.AVOID BREATH VAP.WEAR APPRO PPE INCLUDE APPROP RESP PROT.COINAIN SPILL IF POSSIBLE.WIPE UP/ABSORB ON SUITABLE MATL & SHOVEL UP.PREVENT ENTRY INTO SEWERS/WATERWAYS.AOVI DSKIN/EYE/CLOTH CONTACT.>100000LBS SPILL REPORT UNLESS PETRO EXEMPTION.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: PROD AS PRESENTLY CONSITUTED HAS RCRA CLASSIFICATION OF BENZENE TOXICITY/IGN.DISCARD IN PRESENT FORM WYOLD HAVE HAZ WASTE #:D018,D001.USER RESPONSIBILITY TO DETERMINE @DISPO TIME WHETHER PROD MEETS RCRA HAZ WASTE DUE TO MIX/TRANSFORM/PROCES S/EIC.

Handling And Storage Precautions: STORE AWAY FROM HEAT/OPEN FLAME.PERIODS OF EXPO TO HIGH TEMPS SHOULD BE MIN.WATER CONTAIN SHOULD BE AVOIDED.

Other Precautions: COMBUST LIQ/VAP.USE ONLY AS FUEL.

Fire and Explosion Hazard Information

Flash Point Method: CC Flash Point Text: 125F,52C Autoignition Temp Text: 500F

Lower Limits: 0.5 Upper Limits: 4.1

Extinguishing Media: USE WATERSPRAY, DRY CHEMICAL, FOAM OR CARBON DIOXIDE TO EXTINGUISH FLAMES. USE WATERSPRAY TO COOL FIRE-EXPO CNINRS.

Fire Fighting Procedures: WEAR SPEC CHEM PROT CLOTH/+PRESSURE SCBA.APPROACH FIRE FROM UPWIND TO AVOID HAZ VAP/TOXIC DECOMPO PROD.DECONTAM/DISCARD ANY CLOTH THAT MAY CONTAIN CHEM RESIDUES

Unusual Fire/Explosion Hazard: NONE

Control Measures

Respiratory Protection: AIRBORNE CONCEN SHOULD BE KEPT TO LOWEST LEVELS POSSIBLE.VAP/MIST/DUST GENERATED/PROD/INGREDS OCCUPAT LIMITS EXCEED USE APPROPR NIOSH/MSHA APPROV AIR PURIF/AIR SUPP RESP AFT AIRBORNE CONTAM CONCEN DETERMINE.AIR SUPP RESP FOR CONTAM/OXY UNK

Ventilation: LOC EXHAU VENTI RECOMMENDED IF GENERATING VAP/DUST/MIST.EXHAU VENTI NOT AVAIL/INADEQUATE USEMSHA/NISOH APPROV RESP.

Protective Gloves: GLOVES RESIST TO CHEM & PETRO DISTILLATS

Eye Protection: SAF GLASSES, CHEM TYP GOGG, FACESHIELD.

Other Protective Equipment: EYEWASH/SAF SHOWER AVAIL WHERE PROD HNDL/USE.PRO

http://hazard.com/msds2/f/95/cdyfd.html BRIX 001106 Page 3 of 7

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CLOTH-COVERALL, LAB COATS. HNDLG LG QUANT IMPERV SUITS, GLOVES, RUBB BOOTS. Work Hygienic Practices: DISCARD/DECONTAM CLOTH/SHOES BEF REUSE-WASH/DRYCLEAN(EFFECTIVE).INFORM DRYCLEAN PERSON OF POT HAZ OF SOAK MATL. Supplemental Safety and Health: HEALTH: POSSIBLE TISSUE DESTRUCTION.PROL/REP/WIDESPREAD RESULT IN ABSORPT OF POI HARMFUL AMTS.INHAL: VAP/MIST IRRIT NOSE/THROAT.ASPHYXIATION MAY RESULT.PROL/REP ABORPT OF POT HARMFUL AMIS.INGEST:>SEVERAL MOUTHFULS ABD DISCOMFT, ANU, DIARR, ASPIR ATION-LUNG DMG. 1STAID: AIR.GIVE ART RESP/OXY AS NEEDED.GET MED ATIN IMMED. _____ Physical/Chemical Properties _____ HCC: F4 B.P. Text: 650F,343C M.P/F.P Text: NA Vapor Pres: <10MM Vapor Density: M/DETERMIN Spec Gravity: 0.8521 PH: NA Viscosity: 3 CST @37.7C Appearance and Odor: BRIGHT AND CLEAR LQUID (TAX EXEMPT DIESELS-PALE RED LIQUID), PETROLEUM ODOR Reactivity Data Stability Condition To Avoid: MATL REACTS VIOLENTLY W/HEAT. Materials To Avoid: STRONG OXIDIZERS. Hazardous Decomposition Products: TOXIC LEVELS OF CARBON MONOXIDE, CARBON DIOXIDE, IRRIT ALDEHYDES & KETONES. Hazardous Polymerization Indicator: NO Toxicological Information Ecological Information _______________ ______ MSDS Transport Information Regulatory Information Other Information

Transportation Information

Responsible Party Cage: 2R503

Trans ID NO: 66912

Product ID: 26120 DIESEL 2 FUEL MSDS Prepared Date: 12/08/1995

Review Date: 07/03/1997

MFN: 1

Tech Entry NOS Shipping Nm: FUEL OIL

Net Unit Weight: 35.5 LBS Multiple KIT Number: 0

Review IND: Y Unit Of Issue: DR

Container QTY: 5 GALLONS
Type Of Container: CAN

Additional Data: PER MSDS:DOT:FUEL OIL, COMBUST LIQ, NA1993, PKG

III; IMDG/ICAO/TDG: NOT EVALUATED.

Detail DOT Information

DOT PSN Code: GOD

Symbols: D

DOT Proper Shipping Name: FUEL OIL DOT PSN Modifier: (NO. 1, 2, 4, 5 OR 6)

Hazard Class: 3 UN ID Num: NA1993

DOT Packaging Group: III Label: FLAMMABLE LIQUID Special Provision: B1 Non Bulk Pack: 203 Bulk Pack: 242 Max Qty Pass: 60 L Max Qty Cargo: 220 L

Detail IMO Information

IMO PSN Code: HIA

Vessel Stow Req: A

IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o

IMDG Page Number: 3345

UN Number: 1993 UN Hazard Class: 3.3 IMO Packaging Group: III Subsidiary Risk Label: -

EMS Number: 3-07

MED First Aid Guide NUM: T

Detail IATA Information

IATA PSN CA

IATA UN ID Num: 1993

IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *

IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID

UN Packing Group: III

Packing Note Passenger: 309

Max Quant Pass: 60L Max Quant Cargo: 220L Packaging Note Cargo: 310

Detail AFI Information

AFI PSN CA AFI Symbols: *

AFI Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.

AFI Hazard Class: 3
AFI UN ID NUM: UN1993
AFI Packing Group: III
Special Provisions: P5
Back Pack Reference: A7.3

HAZCOM Label

Product ID: 26120 DIESEL 2 FUEL

Cage: 2R503

Company Name: TEXACO REFINING AND MARKETING INC

Street: 1111 RUSK ST City: HOUSTON TX Zipcode: 77002-3310

Health Emergency Phone: 800-424-9300 (CHEMTREC) / 914-831-3400

Label Required IND: Y

Date Of Label Review: 07/03/1997

Status Code: C

Label Date: 07/03/1997 Origination Code: G Chronic Hazard IND: Y Eye Protection IND: YES Skin Protection IND: YES Signal Word: WARNING

Respiratory Protection IND: YES

Health Hazard: Moderate Contact Hazard: Slight Fire Hazard: Moderate Reactivity Hazard: None

Hazard And Precautions: READ/UNDERSTAND MSDS BEF HNDLG/DISPO

PROD.DIZZ, DROWS, SKIN/EYE IRRIT.ASPIRATION HAZ-LUNG DMG.COMBUST LIQ/VAP.USE ONLY AS FUEL.ATTN:CONTAINS MIDDLE DISTILLATES WHICH MAY CAUSE CANC BASED ON ANIMAL DATA.1STAID:EYE:IMMED FLUSH W/PLENTY OF WATER FOR @LEAST 15MINS.HOLD EYELIDS APART.GET MED ATIN.SKIN:IMMED REMOVE CONTAM CLOTH/SHOES.SFETY SHOWER FLUSH WELL W/LG AMTS OF RUNNING WATER FOR @LEAST 15MINS.DONT NEUTRALIZE W/CHEM AGENTS.GET MED ATTN IMMED.INGEST:CONSC/CAN SWALLOW GIVE 2 GL ASSES OF WATER (160Z).DONT INDUCE VOMIT.VOMIT OCCURS GIVE FLUIDS AGAIN.SEE MED PERSONNEL REFER TO VOMIT.INHAL:MOVE TO FRESH AIR.GIVE ART RESP/OXY.GET MED ATTN IMMED.

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LUBRICATION ENGINEERS INC -- 8800 MONOLEC ULTRA ENGINE OIL

MSDS Safety Information

FSC: 9150

MSDS Date: 07/27/1994

MSDS Num: CGBND LIIN: 00N081784

Product ID: 8800 MONOLEC ULTRA ENGINE OIL

MFN: 01

Responsible Party

Cage: 08171

Name: LUBRICATION ENGINEERS INC Address: 3851 AIRPORT FREEWAY City: FORT WORTH TX 76111

Info Phone Number: 817-834-6321 Emergency Phone Number: 817-834-6321

Proprietary Ind: Y

Published: Y

Contractor Summary

Cage: 08171

Name: LUBRICATION ENGINEERS INC Address: 385 AIRPORT FREEWAY

Box: 7128

City: FORT WORTH TX 76111

Phone: 817-834-6321

Ingredients

Name: *** PROPRIETARY ***

Health Hazards Data

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry Inds - Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Inds - NTP: NO

IARC: NO OSHA: NO

Effects of Exposure: ACUTE: ALTHOUGH THERE ARE NO CONSISTENT PRIMARY ROUTES OF ENTRY, THE PRODUCT MAY CAUSE MILD DERMITTIS UPON PROLONGED CONTACT AND IS

EXPECTED TO BE AN EYE AND LUNG IRRITANT.

Explanation Of Carcinogenicity: NOT RELEVANT.

Signs And Symptions Of Overexposure: SEE HEALTH HAZARDS.

Medical Cond Aggravated By Exposure: ANY EXISTING SKIN, EYE, OR LUNG IRRITATION MAY BE AGGRAVATED BY DIRECT CONTACT.

First Aid: EYE CONTACT: FLUSH IMMEDIATELY WITH WATER FOR AT LEAST 15 MINUTES

UNTIL IRRITATION SUBSIDES. SKIN CONTACT: WASH AFFECTED SKIN WITH MILD SOAP AND WATER. INGESTION: DO NOT INDUCE VOMITING. CONTACT PHYSICIAN. INHALATION: REMOVE TO FRESH AIR. I F NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. CONTACT PHYSICIAN.

Handling and Disposal

Spill Release Procedures: REMOVE ALL SOURCES OF IGNITION. TREAT AS A PETROLEUM OIL SPILL.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: INCINERATE WHERE PERMITTED UNDER FEDERAL, STATE, AND LOCAL LAWS. USED PETROLEUM PRODUCTS MAY BE RECYCLED THROUGH RE-REFINING PROCESSES.

Handling And Storage Precautions: CLOSE CONTAINERS WHEN NOT USE. KEEP AWAY FROM HEAT, SPARKS, OPEN FLAMES, AND STRONG OXIDANTS.

Other Precautions: AVOID EYE CONTACT AND PROLONGED SKIN CONTACT. AVOIDBREATHING OIL MISTS.

Fire and Explosion Hazard Information

Flash Point Method: COC Flash Point Text: 410F,210C

Extinguishing Media: FOAM, DRY CHEMICL, WATER FCG, OR CARBON DIOXIDE. Fire Fighting Procedures: USE NIOSH APPROVED SCBA & FULL PROTECTIVE

EQUIPMENT (FP N). DO NOT DIRECT SOLID STREAM OF WATER INTO FIRE. TREAT AS A PETROLEUM OIL FIRE.

Unusual Fire/Explosion Hazard: NONE.

Control Measures

Respiratory Protection: USUALLY NOT NEEDED IN OPEN, UNCONFINED AREAS. NIOSH APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation: USUALLY NOT NEEDED IN OPEN, UNCONFINED AREAS. Protective Gloves: PROTECTIVE NEOPRENE OR PLASTIC GLOVES. Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: ANSI APPRVD EYE WASH & DELUGE SHOWER (FP N).

Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.

Supplemental Safety and Health: NONE SPECIFIED BY MANUFACTURER.

Physical/Chemical Properties

B.P. Text: >500F,>260C Vapor Pres: <5 @ 60F Vapor Density: >1

Spec Gravity: 0.88 (H*20=1)

PH: 6-8

Evaporation Rate & Reference: NOT KNOWN

Solubility in Water: NEGLIGIBLE

Appearance and Odor: RED LUBRICANT, LUBE OIL ODOR.

Reactivity Data

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Stability Indicator: YES

Stability Condition To Avoid: CONTACT WITH NUCLEAR RADIATION AND STRONG

OXIDIZING MATERIALS.

Materials To Avoid: STRONG OXIDIZING MATERIALS.

Hazardous Decomposition Products: DENSE SMOKE; OXIDES OF C, S, MG, N, P, ZN, B

AND CA; HYDROGEN SULFIDE.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: NOT RELEVANT.

Toxicological Information

Ecological Information

MSDS Transport Information

Regulatory Information

Other Information

HAZCOM Label

Product ID: 8800 MONOLEC ULTRA ENGINE OIL

Cage: 08171

Company Name: LUBRICATION ENGINEERS INC

Street: 385 AIRPORT FREEWAY

PO Box: 7128

City: FORT WORTH TX

Zipcode: 76111

Health Emergency Phone: 817-834-6321

Label Required IND: Y

Date Of Label Review: 01/06/1998

Status Code: C

Label Date: 01/06/1998
Origination Code: G
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: CAUTION

Respiratory Protection IND: YES

Health Hazard: None Contact Hazard: Slight Fire Hazard: Slight Reactivity Hazard: None

Hazard And Precautions: ACUTE: ALTHOUGH THERE ARE NO CONSISTENT PRIMARY ROUTES OF ENTRY, THE PRODUCT MAY CAUSE MILD DERMITITIS UPON PROLONGED CONTACT AND IS

EXPECTED TO BE AN EYE AND LUNG IRRITANT. CHRONIC: NONE LISTED BY

MANUFACTURER.

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PAH Contaminated Soil 17974

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: PAH Contaminated Soil

Catalog Numbers:

SRS103 100, SRS103100

Synonyms:

API separator sludge

Company Identification: Fisher Scientific

1 Reagent Lane

Fairlawn, NJ 07410

201-796-7100 For information, call: Emergency Number: 201-796-7100

For CHEMITREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

| CAS# | Chemical Name | | EINECS# |
|---------------|----------------------|-------------|-----------|
| 50-32-8 | Benzo(a)pyrene | 0-2 | 200-028-5 |
| 56-55-3 | 1,2-Benzanthracene | 0-2 | 200-280-6 |
| 83-32-9 | Acenaphthene | 0-2 | 201-469-6 |
| 85-01-8 | Phenanthrene | 0-2 | 201-581-5 |
| 86-73-7 | Fluorene | 0-2 | 201-695-5 |
| 87-86-5 | Pentachlorophenol | 0-2 | 201-778-6 |
| 91-20-3 | Naphthalene | 0-2 | 202-049-5 |
| 91-57-6 | 2-methylnaphthalene | 0-2 | 202-078-3 |
| 120-12-7 | Anthracene | 0-2 | 204-371-1 |
| 129-00-0 | Pyrene | 0-2 | 204-927-3 |
| 132-64-9 | Dibenzofuran | 0-2 | 205-071-3 |
| 205-99-2 | Benzo(b)fluoranthene | 0-2 | 205-911-9 |
| 206-44-0 | Fluoranthene | 0-2 | 205-912-4 |
| 208-96-8 | Acenaphthylene | 0-2 | 205-917-1 |
| 218-01-9 | 1,2-benzphenanthrene | 0-2 | 205-923-4 |
| Not available | Soil | 78-99 | unlisted |

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: not available.

Caution! Causes skin irritation. Causes eye irritation. May cause allergic skin reaction. Causes digestive tract irritation. May cause digestive tract irritation with nausea, vomiting, and diarrhea. May cause cancer based on animal studies.

Target Organs: None.

Potential Health Effects

Eye:

May cause eye irritation.

May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and

Inhalation:

Causes respiratory tract irritation. May cause effects similar to those described for ingestion.

Chronic:

May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

Ingestion:

If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Treat symptomatically and

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.

Storage:

Store in a cool, dry place.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|------------------|--|-------------|--|
| Benzo (a) pyrene | as benzene solubles: 0.2 mg/m3 (listed under ** no name **). | none listed | benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaF, phenanthrene, acridine, chrysene, and pyrene) (listed |

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| | | | under ** no name **). |
|---------------------------|--|---|--|
| 1,2-Benzanthracene | none listed | none listed | none listed |
| Acenaphthene | none listed | none listed | none listed |
| Phenanthrene | as benzene solubles: 0.2 mg/m3 (listed under ** no name **). | none listed | benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **). |
| Fluorene | none listed | none listed | none listed |
| Pentachlorophenol | 0.5 mg/m3; skin - potential for cutaneous absorption | 0.5 mg/m3 TWA 2.5 mg/m3 IDLH | 0.5 mg/m3 TWA |
| Naphthalene | 10 ppm; 15 ppm STEL; skin - potential for cutaneous absorption | 10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH | 10 ppm TWA; 50 mg/m3 TWA |
| 2-methylnaphthalene | none listed | none listed | none listed |
| Anthracene | as benzene solubles: 0.2 mg/m3 (listed under ** no name **). | none listed | benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phemanthrene, acridine, chrysene, and pyrene) (listed under ** no name **). |
| Pyrene | as benzene solubles: 0.2 mg/m3 (listed under ** no name **). | none listed | benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **). |
| Dibenzofuran | none listed | none listed | none listed |
| Benzo(b) fluoranthen e | none listed | none listed | none listed |
| Fluoranthene | none listed | none listed | none listed |
| Acenaphthylene | none listed | none listed | none listed |
| 1,2-benzphenanthren e | as benzene solubles: 0.2 mg/m3 (listed under ** no name **). | none listed | benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **). |

```
OSHA Vacated PELs:
         Benzo(a)pyrene:
         benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
         phenathrene, acridine, (listed under ** no name **)
          1,2-Benzanthracene:
             No OSHA Vacated PELs are listed for this chemical.
         Acenaphthene:
            No OSHA Vacated PELs are listed for this chemical.
         Phenanthrene:
         benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
         phenathrene, acridine, (listed under ** no name **)
         Fluorene:
            No OSHA Vacated PELs are listed for this chemical.
         Pentachlorophenol:
          0.5 mg/m3 TWA
          Naphthalene:
          10 ppm TWA; 50 mg/m3 TWA
         2-methylnaphthalene:
             No OSHA Vacated PELs are listed for this chemical.
         Anthracene:
         benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
         phenathrene, acridine, (listed under ** no name **)
         Pyrene:
         benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
         phenathrene, acridine, (listed under ** no name **)
         Dibenzofuran:
            No OSHA Vacated PELs are listed for this chemical.
         Benzo (b) fluoranthene:
            No OSHA Vacated PELs are listed for this chemical.
         Fluoranthene:
            No OSHA Vacated PELs are listed for this chemical.
         Acenaphthylene:
            No OSHA Vacated PELs are listed for this chemical.
          1,2-benzphenanthrene:
          benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
         phenathrene, acridine, (listed under ** no name **)
    Personal Protective Equipment
                Eves:
                      Wear appropriate protective eyeglasses or chemical
                      safety goggles as described by OSHA's eye and face
                      protection regulations in 29 CFR 1910.133 or European
                      Standard EN166.
                Skin:
                      Wear appropriate gloves to prevent skin exposure.
            Clothing:
                      Wear appropriate protective clothing to prevent skin
                      exposure.
         Respirators:
                      Follow the OSHA respirator regulations found in 29CFR
                       1910.134 or European Standard EN 149. Always use a
                       NIOSH or European Standard EN 149 approved respirator
                      when necessary.
            **** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****
Physical State:
                            Solid
Appearance:
                            not available
Odor:
                            None reported
:Hq
                            Not available.
Vapor Pressure:
                            Not applicable.
Vapor Density:
                            Not available.
Evaporation Rate:
                           Not applicable.
Viscosity:
                           Not applicable.
Boiling Point:
                            Not available.
Freezing/Melting Point:
                           Not available.
Autoignition Temperature: Not applicable.
Flash Point:
                            Not applicable.
NFPA Rating:
                            Not published.
Explosion Limits, Lower:
                            Not available.
                 Upper:
                           Not available.
```

BRIX 001118

Insoluble in water.

Not available.

Decomposition Temperature: Not available.

Solubility:

Specific Gravity/Density:

```
Molecular Formula:
                            Mixture
Molecular Weight:
                **** SECTION 10 - STABILITY AND REACTIVITY ****
    Chemical Stability:
         Stable under normal temperatures and pressures.
    Conditions to Avoid:
         High temperatures.
    Incompatibilities with Other Materials:
         None reported.
    Hazardous Decomposition Products:
         No data available.
    Hazardous Polymerization: Has not been reported.
                **** SECTION 11 - TOXICOLOGICAL INFORMATION ****
    RTECS#:
         CAS# 50-32-8: DJ3675000
         CAS# 56-55-3: CV9275000
         CAS# 83-32-9: AB1000000
         CAS# 85-01-8: SF7175000
         CAS# 86-73-7: LL5670000
         CAS# 87-86-5: SM6300000
         CAS# 91-20-3: QJ0525000
         CAS# 91-57-6: QJ9635000
         CAS# 120-12-7: CA9350000
         CAS# 129-00-0: UR2450000
         CAS# 132-64-9: HP4430000
         CAS# 205-99-2: CU1400000
         CAS# 206-44-0: LL4025000
         CAS# 208-96-8: AB1254000
         CAS# 218-01-9: GC0700000
   LD50/LC50:
         Not available.
         Not available.
         Not available.
         CAS# 85-01-8: Oral, mouse: LD50 = 700 mg/kg.
         CAS# 86-73-7.
         CAS# 87-86-5: Inhalation, mouse: LC50 =225 mg/m3; Inhalation, rat:
         LC50 = 355 \text{ mg/m3}; Oral, mouse: LD50 = 117 \text{ mg/kg}; Oral, rat: LD50 = 27
         mg/kg; Skin, rat: LD50 = 96 mg/kg.
         CAS# 91-20-3: Oral, mouse: LD50 = 533 mg/kg; Oral, rat: LD50 = 490
         mg/kg; Skin, rabbit: LD50 = >20 gm/kg; Skin, rat: LD50 = >2500 mg/kg.
         CAS# 91-57-6: Oral, mouse: LD50 = 1279 mg/kg; Oral, rat: LD50 = 1630
         mg/kg.
         CAS# 120-12-7.
         CAS\# 129-00-0: Inhalation, rat: LC50 =170 mg/m3; Oral, mouse: LD50 =
          800 mg/kg; Oral, rat: LD50 = 2700 mg/kg.
          CAS# 132-64-9.
         CAS# 205-99-2.
         CAS# 206-44-0: Oral, rat: LD50 = 2 gm/kg; Skin, rabbit: LD50 = 3180
         mg/kg.
         CAS# 208-96-8.
         CAS# 218-01-9.
   Carcinogenicity:
      Benzo(a)pyrene
              ACGIH: A2 - suspected human carcinogen
         California: carcinogen; initial date 7/1/87
              NIOSH: occupational carcinogen (listed as ** undefined **)
                NTP: Suspect carcinogen
               OSHA: Possible Select carcinogen
               IARC: Group 2A carcinogen
      1,2-Benzanthracene -
               ACGIH: A2 - suspected human carcinogen
         California: carcinogen; initial date 7/1/87
                NTP: Suspect carcinogen
               OSHA: Possible Select carcinogen
               IARC: Group 2A carcinogen
      Acenaphthene -
         Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
      Phenanthrene -
              ACGIH: Benzene solubles: A1-confirmed human carcinogen (listed as
              NIOSH: occupational carcinogen (listed as ** undefined **)
               OSHA: Select carcinogen (listed as ** undefined **).
               IARC: Group 3 carcinogen
      Fluorene
```

```
IARC: Group 3 carcinogen
      Pentachlorophenol -
              ACGIH: A3 - Animal Carcinogen
         California: carcinogen; initial date 1/1/90
      Naphthalene -
              ACGIH: A4 - Not Classifiable as a Human Carcinogen
       2-methylnaphthalene -
          Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
      Anthracene -
              ACGIH: Benzene solubles: Al-confirmed human carcinogen (listed as
              NIOSH: occupational carcinogen (listed as ** undefined **)
               OSHA: Select carcinogen (listed as ** undefined **).
               IARC: Group 3 carcinogen
      Pyrene -
              ACGIH: Benzene solubles: A1-confirmed human carcinogen (listed as
              NIOSH: occupational carcinogen (listed as ** undefined **)
               OSHA: Select carcinogen (listed as ** undefined **).
               IARC: Group 3 carcinogen
      Dibenzofuran -
         Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
      Benzo (b) fluoranthene ·
              ACGIH: A2 - suspected human carcinogen
         California: carcinogen; initial date 7/1/87
                NTP: Suspect carcinogen
               OSHA: Possible Select carcinogen
               IARC: Group 2B carcinogen
      Fluoranthene -
               IARC: Group 3 carcinogen
      Acenaphthylene -
         Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
       1,2-benzphenanthrene -
               ACGIH: A3 - Animal Carcinogen
         California: carcinogen; initial date 1/1/90
              NTOSH: occupational carcinogen (listed as ** undefined **)
               OSHA: Select carcinogen (listed as ** undefined **).
               IARC: Group 3 carcinogen
                 **** SECTION 12 - ECOLOGICAL INFORMATION ****
                **** SECTION 13 - DISPOSAL CONSIDERATIONS ****
Chemical waste generators must determine whether a discarded chemical is classif
as a hazardous waste.
US EPA guidelines for the classification determination are listed in 40 CFR Part
Additionally, waste generators must consult state and local hazardous waste regu
ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 50-32-8: waste number U022. CAS#
56-55-3: waste number U018. CAS# 91-20-3: waste number
U165. CAS# 206-44-0: waste number U120. CAS# 218-01-9:
waste number U050.
                 **** SECTION 14 - TRANSPORT INFORMATION ****
    US DOT
        No information available
    Canadian TDG
         No information available.
                 **** SECTION 15 - REGULATORY INFORMATION ****
US FEDERAL
    TSCA
         CAS# 50-32-8 is listed on the TSCA inventory.
         CAS# 56-55-3 is listed on the TSCA inventory.
         CAS# 83-32-9 is listed on the TSCA inventory.
         CAS# 85-01-8 is listed on the TSCA inventory.
         CAS# 86-73-7 is listed on the TSCA inventory.
         CAS# 87-86-5 is listed on the TSCA inventory.
         CAS# 91-20-3 is listed on the TSCA inventory.
         CAS# 91-57-6 is listed on the TSCA inventory.
         CAS# 120-12-7 is listed on the TSCA inventory.
         CAS# 129-00-0 is listed on the TSCA inventory.
         CAS# 132-64-9 is listed on the TSCA inventory.
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CAS# 205-99-2 is not listed on the TSCA inventory.
     It is for research and development use only.
     CAS# 206-44-0 is listed on the TSCA inventory.
     CAS# 208-96-8 is listed on the TSCA inventory.
     CAS# 218-01-9 is listed on the TSCA inventory.
   Health & Safety Reporting List
     CAS# 91-20-3: Effective Date: June 1, 1987; Sunset Date: June 1, 1997
     CAS# 129-00-0: Effective Date: June 1, 1987; Sunset Date: June 1, 1997
   Chemical Test Rules
     Mone of the chemicals in this product are under a Chemical Test Rule.
   Section 12b
     None of the chemicals are listed under TSCA Section 12b.
   TSCA Significant New Use Rule
     None of the chemicals in this material have a SNUR under TSCA.
SARA
   Section 302 (RO)
     CAS# 50-32-8: final RQ = 1 pound (0.454 kg)
     CAS# 56-55-3: final RQ = 10 pounds (4.54 kg)
     CAS# 83-32-9: final RQ = 100 pounds (45.4 kg)
     CAS# 85-01-8: final RQ = 5000 pounds (2270 kg)
CAS# 86-73-7: final RQ = 5000 pounds (2270 kg)
     CAS# 87-86-5: final RQ = 10 pounds (4.54 \text{ kg})
     CAS# 91-20-3: final RQ = 100 pounds (45.4 kg)
CAS# 120-12-7: final RQ = 5000 pounds (2270 kg)
     CAS# 129-00-0: final RQ = 5000 pounds (2270 kg)
     CAS# 205-99-2: final RQ = 1 pound (0.454 kg)
     CAS# 206-44-0: final RQ = 100 pounds (45.4 kg)
     CAS# 208-96-8: final RQ = 5000 pounds (2270 kg)
     CAS# 218-01-9: final RQ = 100 pounds (45.4 kg)
   Section 302 (TPQ)
     CAS# 129-00-0: TPO = 1000/10,000 pounds; RQ = 5000 pounds (calculated
     TPQ changed after technic al review as described in the technical
     support document)
   SARA Codes
     CAS # 50-32-8: acute, chronic.
     CAS # 83-32-9: acute.
     CAS # 85-01-8: acute.
     CAS # 91-20-3: flammable.
     CAS # 91-57-6: acute.
     CAS # 120-12-7: acute.
     CAS # 129-00-0: acute, chronic.
     CAS # 206-44-0: acute.
   Section 313
     This material contains Benzo(a)pyrene (CAS# 50-32-8, 0 2%), which is
     subject to the reporting requirements of Section 313 of SARA Title
     III and 40 CFR Part 372.
     This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0 2%), which
     is subject to the reporting requirements of Section 313 of SARA
     Title III and 40 CFR Part 372.
     This chemical is not at a high enough concentration to be reportable
     under Section 313.
     This material contains Pentachlorophenol (CAS# 87-86-5, 0 2%), which
     is subject to the reporting requirements of Section 313 of SARA Title
     III and 40 CFR Part 372.
     This chemical is not at a high enough concentration to be reportable
     under Section 313.
     This chemical is not at a high enough concentration to be reportable
     under Section 313.
     This chemical is not at a high enough concentration to be reportable
     under Section 313.
     This material contains Benzo(b) fluoranthene (CAS# 205-99-2, 0
      2%), which is subject to the reporting requirements of Section 313 of
      SARA Title III and 40 CFR Part 372.
     This chemical is not at a high enough concentration to be reportable
     under Section 313.
Clean Air Act:
     CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
     CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).
     CAS# 132-64-9 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors.
     This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
     CAS# 87-86-5 is listed as a Hazardous Substance under the CWA.
     CAS# 91-20-3 is listed as a Hazardous Substance under the CWA.
     CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water
     Act.
     CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water
     Act.
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CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water
CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 91-20-3 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water
Act.
CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water
Act.
CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water
Act.
CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water
Act.
CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water
Act.
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OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

Benzo(a)pyrene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

1,2-Benzanthracene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Acenaphthene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

Phenanthrene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Fluorene can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

Pentachlorophenol can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Naphthalene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

2-methylnaphthalene is not present on state lists from CA, PA, MN, MA, FL, or NJ.

Anthracene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Pyrene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Dibenzofuran can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

Benzo(b) fluoranthene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Fluoranthene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

Acenaphthylene can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

1,2-benzphenanthrene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer.

WARNING: This product contains 1,2-Benzanthracene, a chemical known

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to the state of California to cause cancer.
    WARNING: This product contains Pentachlorophenol, a chemical known to
    the state of California to cause cancer.
    WARNING: This product contains Benzo(b)fluoranthene, a chemical known
    to the state of California to cause cancer.
    WARNING: This product contains 1,2-benzphenanthrene, a chemical known
    to the state of California to cause cancer.
    California No Significant Risk Level:
    CAS# 50-32-8: no significant risk level = 0.06 ug/day
    CAS# 87-86-5: no significant risk level = 40 ug/day
European/International Regulations
    European Labeling in Accordance with EC Directives
         Hazard Symbols: Not available.
         Risk Phrases:
         Safety Phrases:
  WGK (Water Danger/Protection)
         CAS# 50-32-8: No information available.
         CAS# 56-55-3: No information available.
         CAS# 83-32-9: No information available.
         CAS# 85-01-8: No information available.
         CAS# 86-73-7: No information available.
         CAS# 87-86-5: 3
         CAS# 91-20-3: 2
        CAS# 91-57-6: No information available.
         CAS# 120-12-7: 2
         CAS# 129-00-0: No information available.
         CAS# 132-64-9: No information available.
         CAS# 205-99-2: No information available.
         CAS# 206-44-0: No information available.
         CAS# 208-96-8: No information available.
         CAS# 218-01-9: No information available.
 United Kingdom Occupational Exposure Limits
         CAS# 87-86-5: OES-United Kingdom, TWA 0.5 mg/m3 TWA
        CAS# 87-86-5: OES-United Kingdom, STEL 1.5 mg/m3 STEL
        CAS# 87-86-5: OES-United Kingdom, STEL 1.5 mg/m3 STEL
 Canada
        CAS# 50-32-8 is listed on Canada's DSL/NDSL List.
        CAS# 83-32-9 is listed on Canada's DSL/NDSL List.
        CAS# 85-01-8 is listed on Canada's DSL/NDSL List.
        CAS# 86-73-7 is listed on Canada's DSL/NDSL List.
        CAS# 87-86-5 is listed on Canada's DSL/NDSL List.
        CAS# 91-20-3 is listed on Canada's DSL/NDSL List.
        CAS# 91-57-6 is listed on Canada's DSL/NDSL List.
        CAS# 120-12-7 is listed on Canada's DSL/NDSL List.
        CAS# 129-00-0 is listed on Canada's DSL/NDSL List.
        CAS# 132-64-9 is listed on Canada's DSL/NDSL List.
        CAS# 218-01-9 is listed on Canada's DSL/NDSL List.
        This product has a WHMIS classification of D2A.
        CAS# 50-32-8 is not listed on Canada's Ingredient Disclosure List.
        CAS# 56-55-3 is not listed on Canada's Ingredient Disclosure List.
        CAS# 83-32-9 is not listed on Canada's Ingredient Disclosure List.
        CAS# 85-01-8 is not listed on Canada's Ingredient Disclosure List.
        CAS# 86-73-7 is not listed on Canada's Ingredient Disclosure List.
        CAS# 87-86-5 is not listed on Canada's Ingredient Disclosure List.
        CAS# 91-20-3 is not listed on Canada's Ingredient Disclosure List.
        CAS# 91-57-6 is not listed on Canada's Ingredient Disclosure List.
        CAS# 120-12-7 is not listed on Canada's Ingredient Disclosure List.
        CAS# 129-00-0 is not listed on Canada's Ingredient Disclosure List.
        CAS# 132-64-9 is not listed on Canada's Ingredient Disclosure List.
        CAS# 205-99-2 is not listed on Canada's Ingredient Disclosure List.
        CAS# 206-44-0 is not listed on Canada's Ingredient Disclosure List.
        CAS# 208-96-8 is not listed on Canada's Ingredient Disclosure List.
        CAS# 218-01-9 is not listed on Canada's Ingredient Disclosure List.
 Exposure Limits
        CAS# 50-32-8: OEL-AUSTRALIA; Carcinogen
        OEL-BELGIUM; Carcinogen
        OEL-FINLAND:TWA 0.01 mg/m3;Skin;Carcinogen
        OEL-FRANCE; Carcinogen
        OEL-GERMANY; Carcinogen
        OEL-RUSSIA:STEL 0.00015 mg/m3;Carcinogen
        OEL-SWEDEN:TWA 0.005 mg/m3;STEL 0.03 mg/m3;Skin
        OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
        OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
        CAS# 56-55-3: OEL-FRANCE; Carcinogen
        CAS# 83-32-9: OEL-RUSSIA:STEL 10 mg/m3
        CAS# 85-01-8 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14
        mg/m3 JANUARY 1993
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OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 86-73-7: Not available.
CAS# 87-86-5: OEL-AUSTRALIA: TWA 0.5 mg/m3; Skin
OEL-BELGIUM: TWA 0.5 mg/m3; Skin
OEL-DENMARK: TWA 0.05 ppm (0.5 mg/m3); Skin
OEL-FINLAND: TWA 0.5 mg/m3; STEL 1.5 mg/m3; Skin
OEL-FRANCE: TWA 0.5 mg/m3; Skin
OEL-GERMANY: TWA 0.005 ppm (0.05 mg/m3); Skin
OEL-HUNGARY: TWA 0.2 mg/m3; STEL 0.4 mg/m3; Skin
OEL-JAPAN: TWA 0.5 mg/m3; Skin
OEL-THE NETHERLANDS:TWA 0.5 mg/m3;Skin
OEL-THE PHILIPPINES: TWA 0.5 mg/m3; Skin
OEL-RUSSIA:STEL 0.1 mg/m3;Skin
OEL-SWEDEN:TWA 0.5 mg/m3;STEL 1.5 mg/m3;Skin JAN9
OEL-SWITZERLAND: TWA 0.05 ppm (0.5 mg/m3); STEL 0.1 ppm; Skin
OEL-TURKEY:TWA 0.5 mg/m3;Skin
OEL-UNITED KINGDOM:TWA 0.5 mg/m3;STEL 1.5 mg/m3;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACCIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 91-20-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3)
OEL-AUSTRALIA: TWA 10 ppm (50 mg/m3); STEL 15 ppm (75 mg/m3)
OEL-BELGIUM: TWA 10 ppm (52 mg/m3); STEL 15 ppm (79 mg/m3)
OEL-DENMARK: TWA 10 ppm (50 mg/m3)
OEL-FINLAND: TWA 10 ppm (50 mg/m3); STEL 20 ppm (10 mg/m3)
OEL-FRANCE: TWA 10 ppm (50 mg/m3)
OEL-GERMANY:TWA 10 ppm (50 mg/m3)
OEL-HUNGARY:TWA 40 mg/m3;STEL 80 mg/m3;Skin
OEL-THE NETHERLANDS: TWA 10 ppm (50 mg/m3)
OEL-THE PHILIPPINES:TWA 10 ppm (50 mg/m3)
OEL-POLAND: TWA 20 mg/m3
OEL-RUSSIA:STEL 20 mg/m3
OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3)
OEL-UNITED KINGDOM:TWA 10 ppm (50 mg/m3);STEL 15 ppm (75 mg/m3)
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 91-57-6: OEL-RUSSIA:STEL 20 mg/m3
CAS# 120-12-7 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14
mg/m3 JANUARY 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 129-00-0 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14
mg/m3 JANUARY 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 205-99-2: OEL-FRANCE; Carcinogen
OEL-GERMANY; Carcinogen
CAS# 206-44-0: Not available.
CAS# 208-96-8: Not available.
CAS# 218-01-9: OEL-AUSTRALIA; Carcinogen
OEL-BELGIUM; Carcinogen
OEL-GERMANY; Carcinogen
OEL-SWITZERLAND; Carcinogen
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
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**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/02/1997 Revision #2 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

ENVIRONMENTAL RESOURCE ASSOC -- BTEX IN WATER/SOIL, 761 (SOIL ONLY) _______ MSDS Safety Information FSC: 6665 MSDS Date: 01/08/1993 MSDS Num: CBPZM LIIN: 00N072170 Product ID: BTEX IN WATER/SOIL, 761 (SOIL ONLY) MFN: 01 Responsible Party Cage: 1R664 Name: ENVIRONMENTAL RESOURCE ASSOC Address: 5540 MARSHALL ST City: ARVADA CO 80002 Info Phone Number: 303-431-8454 Emergency Phone Number: 303-431-8454 Published: Y Contractor Summary ______ Cage: 1R664 Name: ENVIRONMENTAL RESOURCE ASSOCIATES Address: 5540 MARSHALL STREET City: ARVADA CO 80002 Phone: 303-431-8454 Ingredients Cas: 67-56-1 RTECS #: PC1400000 Name: METHANOL (SARA 313) (CERCLA) 용 Wt: >99 OSHA PEL: 200 PPM, S ACGIH TLV: 200 PPM; 250 STEL, S EPA Rpt Qty: 5000 LBS DOT Rot Qty: 5000 LBS Cas: 71-43-2 RTECS #: CY1400000 Name: BENZENE (SARA 313) (CERCLA) 8 Wt: <0.1 OSHA PEL: N/K (FP N) ACGIH TLV: 10 PPM EPA Rpt Qty: 10 LBS DOT Rpt Qty: 10 LBS Cas: 100-41-4

RTECS #: DA0700000

용 Wt: <1

Name: BENZENE, ETHYL-; (METHYLBENZENE) (SARA 313)

Untitled 4/19/01 11:49 AM

OSHA PEL: 100 PPM

ACGIH TLV: 100 PPM; 125 STEL

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 108-88-3

RTECS #: XS5250000

Name: TOLUENE (SARA 313) (CERCLA)

8 Wt: <1

OSHA PEL: 200 PPM ACGIH TLV: 50 PPM, S EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Cas: 1330-20-7 RTECS #: ZE2100000

Name: XYLENE; (3-ISOMERS) (SARA 313) (CERCLA)

용 Wt: <1

OSHA PEL: 100 PPM

ACGIH TLV: 100 PPM; 150 STEL

EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS

Health Hazards Data

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry Inds - Inhalation: YES

Skin: YES
Ingestion: YES

Carcinogenicity Inds - NTP: NO

IARC: NO OSHA: NO

Effects of Exposure: PRIMARY IRRITANT. IRRITATES & DMGS ALL TISS, INCL EYES & MUC MEMBS. SKIN: DRY, CRACKED, RED SKIN. MAY PRDCE DEFAT OF SKIN & IRRITANT DERM. EYES: IRRIT & REDNESS. INGEST: IF INGESTED, MAJOR RISK IS METHANOL POISONING W/VISUAL DISTURB OR BLIN DNESS, INTOXICATION, ACIDOSIS W/RAPID BRTHG, MAY PROGRESS TO (EFTS OF OVEREXP)

Explanation Of Carcinogenicity: NOT RELEVANT

Signs And Symptions Of Overexposure: HLTH HAZ: COMA & FATAL ACIDOSIS.

INGESTIONS AS SMALL AS 30CC HAVE CAUSED SERIOUS ILLNESS &/OR PERM LOSS OF
VISION. DUE TO THE SM QTY PRESENT IN PROD, NO TOX EFTS ARE ANIC UNLESS
MULTIPLE VIALS ARE CONSUMED. INHAL: STUPOR/COMA W/SEV EXPOS. M AY IRRITATE
EYES, NASAL PASSAGES, SINUSES, LOWER RESP TRACT W/COUGH & (SUPDAT)

Medical Cond Aggravated By Exposure: DERMATITIS, ALCOHOL INTOXICATION.

First Aid: INHAL: REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE OXYGEN/ARTIFICIAL RESPIRATION) (FP N). SKIN: FLUSH WITH COPIOUS AMOUNTS OF WATER. CALL MD (FP N). REMOVE FROM EXPOSURE. INGEST: GIVE SYRUP OF IPECAC 30CC WITH 180CC WATER AND OBTAIN MEDICA L ASSISTANCE IMMEDIATELY. EYES: IRRIGATE WITH WATER AND SEEK MEDICAL ATTENTION.

Handling and Disposal

Spill Release Procedures: DAM UP AND ABSORB. DISPOSE OF WITH HAZARDOUS WASTE.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS (FP N). ABSORB AND DISPOSE OF WITH HAZARDOUS WASTE.

Handling And Storage Precautions: AVOID FREEZING, BREAKAGE. STORE AWAY FROM STRONG OXIDIZERS, SODIUM OR POTASSIUM. AVOID INHALING DUST OF DRIED SOIL COMPONENT AFTER ADDN OF BTEX CMPDS.

Other Precautions: HANDLE WITH CARE! MATERIAL CONTAINS CARCINOGENS. DO NOTINHALE VAPORS OR DUST OF RECONSTITUTED SOIL SAMPLE.

Fire and Explosion Hazard Information

Flash Point Method: TOC

Flash Point Text: 59.9F,15.5C

Lower Limits: 7.3% Upper Limits: 36%

Extinguishing Media: WATER, DRY CHEMICAL, CARBON DIOXIDE, ALCOHOL FOAM.

Fire Fighting Procedures: USE NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N). IF LARGE AMOUNTS INVOLVED IN FIRE WET DOWN TO KEEP FROM EXPLODING.

USE WATER MIST OR ALCOHOL FOAM.

Unusual Fire/Explosion Hazard: METHANOL MAY BURN WITH A COLORLESS, NEARLY INVISIBLE FLAME.

Control Measures

Respiratory Protection: NIOSH APPROVED ORGANIC VAPOR CARTRIDGE, FULL FACE PIECE OR SELF CONTAINED OR AIR SUPPLIED RESPIRATORY PROTECTION.

Ventilation: USE IN HOOD. VENTILATE SPILLS.

Protective Gloves: VITON OR NEOPRENE.

Eve Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: ANSI APPROVED EYE WASH & DELUGE SHOWER (FP N). LAB COAT, APRON, CLOSED SHOES.

Work Hygienic Practices: USE CAREFUL LAB TECHNIQUE. AVOID HAND CONTACT, AVOID INHALATION OF VAPORS OR DUST OF RECONSTITUTED SOIL SAMPLE.

Supplemental Safety and Health: EFTS OF OVEREXP: & CHEST TIGHTNESS.

CHRONIC: TOLUENE APPEARS ON THE NAVY LIST OF OCCUP CHEM REPRO HAZS. SEEK CONSULTATION FROM APPROP HLIH PROFESSIONALS CONCERNING LATEST HAZ LIST INFO & SAFE HNDLG & EXPOS INFO (FP N). BENZENE IS A KNOWN HU MAN CARCINOGEN.

Physical/Chemical Properties

B.P. Text: 148F,65C Vapor Density: 1.11

Spec Gravity: 0.792 (H*20=1) Solubility in Water: COMPLETE

Appearance and Odor: CLEAR, COLORLESS LIQUID; ORGANIC ODOR.

Reactivity Data

Stability Indicator: YES

Stability Condition To Avoid: NONE SPECIFIED BY MANUFACTURER.

Materials To Avoid: METHANOL CAN REACT VIGOROUSLY WITH OXIDIZING AGENTS, SODIUM, POTASSIUM.

Hazardous Decomposition Products: NONE SPECIFIED BY MANUFACTURER.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: NOT RELEVANT

Toxicological Information

Ecological Information

MSDS Transport Information

Regulatory Information

Other Information

HAZCOM Label

Product ID: BTEX IN WATER/SOIL, 761 (SOIL ONLY)

Cage: 1R664

Company Name: ENVIRONMENTAL RESOURCE ASSOCIATES

Street: 5540 MARSHALL STREET

City: ARVADA CO Zipcode: 80002

Health Emergency Phone: 303-431-8454

Label Required IND: Y

Date Of Label Review: 08/14/1996

Status Code: C

Label Date: 08/14/1996 Origination Code: G Chronic Hazard IND: Y Eve Protection IND: YES Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection IND: YES

Health Hazard: Severe Contact Hazard: Moderate

Fire Hazard: Severe Reactivity Hazard: None

Hazard And Precautions: FLAMMABLE. ACUTE: SKIN: DRY, CRACKED, RED SKIN. MAY PRODUCE DEFATTING AND IRRITANT DERMATITIS. EYES: IRRITATION AND REDNESS. INGESTION: MAJOR RISK IS METHANOL POISONING WITH VISUAL DISTURBANCE OR BLINDNESS, INTOXICATION, ACIDOSIS WITH RAPID BREATHING, MAY PROGRESS TO COMA AND FATAL ACIDOSIS. INGESTIONS AS SMALL AS 30CC HAVE CAUSED SERIOUS ILLINESS AND/OR PERMANENT LOSS OF VISION. INHALATION: STUPOR OR COMA WITH SEVERE EXPOSURE. MAY IRRITATE EYES, MASAL PASSAGES, SINUSES, LOWER RESPIRATORY TRACT WITH COUGH AND CHEST TIGHINESS. CHRONIC: TOLUENE APPEARS ON THE NAVY

OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST (FP N).

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http://hazard.com/msds2/f/93/cbpzm.html

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Material Safety Data Sheet

From: Mallinckrodt Baker, inc. 222 Red School Lane Phillipeburg, NJ 08865

24 Hour Emergency Telephone: 908-869-2161 CREMTRED: 1-800-424-8300

National Response in Canada CARUTEC: \$13-808-8668

Outside U.S. and Canada Cheminat: 703-527-3287

NOTE: CHEMTREC, CANUTEC and Resonal Propose Center an experience and fastoral Propose Center a mergency numbers to be used orly in this event of chancel emergences involving a spill, less, fire, exposure or accident sixonymg creenicals.

All non-emergency experiens should be denoted to Customer Service (1-900-552-2537) for assistance.

METHYL TERT-BUTYL ETHER

MSDS Number: B7222 --- Effective Date: 09/14/00

1. Product Identification

Synonyms: 2-Methoxy-2-methylpropane; tert-Butyl methyl ether; Methyl 1,1-dimethyl ethyl ether; MTBE

CAS No.: 1634-04-4 Molecular Weight: 88.15 Chemical Formula: C5H12O **Product Codes:** J.T. Baker: 9034, 9042, 9043

Mallinckrodt: 5398

2. Composition/Information on Ingredients

Ingredient CAS No Percent Hazardous Methyl tert-butyl Ether 1634-04-4 99 - 100%

3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS, A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 4 - Extreme (Flammable)

Reactivity Rating: 2 - Moderate Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of vapor can irritate respiratory tract. Causes central nervous system effects. Breathing high concentrations in air can cause lightheadedness, dizziness, weakness, nausea, headache.

Ingestion:

May cause nausea, vomiting. Other symptoms similar to inhalation may occur. Laryngeal, ocular, and respiratory muscles are affected in severe poisoning. Skin Contact:

A mild skin irritant which causes loss of natural oils. May be a route of absorption into the body.

Eye Contact:

Vapors can irritate eyes; splashes may cause damage to eye tissue.

Chronic Exposure:

Symptoms noted above may be produced by cumulative exposure.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

http://www.ftbaker.com/madu/67222.bim

BRIX 001130

Page 1 of 4

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: -27C (-17F)

Autoignition temperature: 435C (815F)

Flammable limits in air % by volume:

lel: 1.6; uel: 8.4

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire.

Explosion:

Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool. Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks, Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-ACGIH Threshold Limit Value (TLV); 40 ppm (TWA)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details. Use explosion-proof equipment. Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection: Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance: Clear, colorless liquid. Characteristic ethereal odor.

Solubility: 4.8 g/100g of water. Specific Gravity: 0.74 pH: No information found. % Volatiles by volume @ 21C (70F): 100 **Boiling Point:** 55C (131F) **Melting Point:** -110C (-166F) Vapor Density (Air=1): No information found. Vapor Pressure (mm Hg): 245 @ 25C (77F) Evaporation Rate (BuAc=1): No information found.

10. Stability and Reactivity

Stability: Stable under ordinary conditions of use and storage. Unstable in acid solutions.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur

Incompatibilities:

Oxidizers, acids.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Methyl tert butyl ether: Oral rat LD50: 4 gm/kg; inhalation rat LC50: 23576 ppm/4H.

-----\Cancer Lists\--------NTP Carcinogen---Ingredient Known Anticipated IARC Category Methyl tert-butyl Ether (1634-04-4) No. 3

12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to biodegrade. When released into the air, this material is expected to adversely affect the ozone layer. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days. Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: METHYL TERT-BUTYL ETHER

Hazard Class: 3 UN/NA: UN2398

Packing Group: II

www.jtbaker.com/msds/b7222.htm

Information reported for product/size: 335LB

International (Water, I.M.O.)

Proper Shipping Name: METHYL TERT-BUTYL ETHER

Hazard Class: 3.1 UN/NA: UN2398 Packing Group: II

Information reported for product/size: 335LB

15. Regulatory Information

| \Chemical Inventory Status - Part 1\ | | | | |
|--|---------------|---------------|-----------|----------------------|
| Ingredient | TSCA | EC | | Australia |
| Methyl tert-butyl Ether (1634-04-4) | Yes | Yes | Yes | Yes |
| Ingredient | Korea | Ca a DSL | mada | Phil. |
| Methyl tert-butyl Ether (1634-04-4)\Federal, State & International Regulati | Yes Lons - | Yes Part 1 | № L\/- | Yes |
| | TPQ | Lis | st Cher | A 313 mical Catg. |
| Methyl tert-butyl Ether (1634-04-4) No\Federal, State & International Regulati | | | | |
| | A | | TS | |
| Methyl tert-butyl Ether (1634-04-4) 1000 Chemical Weapons Convention: No TSCA 12(b): SARA 311/312: Acute: Yes Chronic: Yes Fire: | Yes | CDTA: | No | - |
| Reactivity: No (Pure / Liquid) | | | | |

Australian Hazchem Code: 3[Y]E Poison Schedule: No information found.

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 4 Reactivity: 0

Label Hazard Warning: DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS. A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:

Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing.

Avoid breathing vapor. Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use: Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8, 11.

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RELIANCE UPON THIS INFORMATION.

Prepared by: Strategic Services Division Phone Number: (314) 539-1600 (U.S.A.)

International Chemical Safety Cards

ETHYLENE DIBROMIDE

ETHYLENE DIBROMIDE 1,2-Dibromoethane EDB Br(CH₂)₂Br/C₂H₄Br₂

Molecular mass: 187.9

CAS # 106-93-4 RTECS # KH9275000 ICSC # 0045 UN # 1605 EC # 602-010-00-6

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---------------------------------|---|--|---|
| FIRE | Combustible under specific conditions. Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: all extinguishing agents allowed. |
| EXPLOSION | Risk of fire and explosion on contact with powdered metals: see Chemical Dangers. | | |
| EXPOSURE | | AVOID ALL CONTACT! | IN ALL CASES CONSULT A DOCTOR! |
| • INHALATION | Burning sensation. Cough. Laboured breathing. Shortness of breath. Unconsciousness. | Ventilation, local exhaust, or breathing protection. | Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention. |
| • SKIN | MAY BE ABSORBED! Pain. Redness. Blisters. | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention. |
| • EYES | | Face shield, or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| • INGESTION | Abdominal cramps. Confusion. Diarrhoea. Headache (further see Inhalation). | | |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|-------------------|---|---|
| | Separated from strong oxidants, strong bases, powdered metals, food and feedstuffs: see Chemical Dangers. Dry. Keep in the dark. Ventilation along the floor. | Do not transport with food and feedstuffs. T symbol R: 45-23/24/25-36/37/38 S: 53-44 UN Hazard Class: 6.1 UN Packing Group: II IMO: marine pollutant. |

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0045

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

ETHYLENE DIBROMIDE

| I M P O R T A N T D A T A | PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR. PHYSICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes, hydrogen bromide (see ICSC # 0282) and bromine (see ICSC # 0107. The substance decomposes slowly under influence of light and moisture producing corrosive hydrogen bromide. Reacts vigorously with powdered aluminium or magnesium, metals such as sodium, potassium and calcium, strong bases and strong oxidants, causing fire and explosion hazard. Attacks fats, rubber, some plastics and coatings. OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established. | ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion. INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C. EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes, the skin and the respiratory tract. The substance may cause effects on the central nervous system, resulting in lowering of consciousness. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure causing bronchitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans. Animal tests show that this substance possibly causes toxic effects upon human reproduction. | | |
|---|---|---|--|--|
| PHYSICAL PROPERTIES | Boiling point: 131°C Melting point: 10°C Relative density (water = 1): 2.2 Solubility in water, g/100 ml at 20°C: poor | Vapour pressure, kPa at 20°C: 1.5 Relative vapour density (air = 1): 6.5 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.08 Octanol/water partition coefficient as log Pow: 1.93 | | |
| ENVIRONMENTAL This substance may be hazardous to the environment; special attention should be given to water. DATA | | | | |
| NOTES | | | | |
| Depending on the degree of exposure, periodic medical examination is indicated. | | | | |
| Transport Emergency Card: TEC (R)-802 NFPA Code: H3; F0; R0; | | | | |
| | ADDITIONAL INFORMA | TION | | |
| | | | | |
| ICSC: 0045 | | ETHYLENE DIBROMIDE | | |
| | A TRUE CEC 1000 | 1 | | |

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International Chemical Safety Cards

1,2-DICHLOROETHANE

1,2-DICHLOROETHANE

Ethylene dichloride 1,2-Ethylene dichloride Ethane dichloride CICH₂CH₂Cl / C₂H₄Cl₂

Molecular mass: 98.96

CAS # 107-06-2 RTECS # KI0525000 ICSC # 0250 UN # 1184 EC # 602-012-00-7

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING | |
|---|--|---|---|--|
| FIRE | Highly flammable. Gives off irritating or toxic fumes (or gase in a fire. | NO open flames, NO sparks, and NO smoking. | Powder, water spray, foam, carbon dioxide. | |
| EXPLOSION | Vapour/air mixtures are explosive. | Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. | In case of fire: keep drums, etc., cool by spraying with water. | |
| EXPOSURE | | AVOID ALL CONTACT! | IN ALL CASES CONSULT A DOCTOR! | |
| • INHALATION | Abdominal pain. Cough. Dizziness. Drowsiness. Headache. Nausea. Sore throat. Unconsciousness. Vomiting. Symptoms may be delayed (see Notes). | Ventilation, local exhaust, or breathing protection. | Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention. | |
| • SKIN | Redness. Protective gloves. | | Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. | |
| • EYES | Redness, Pain. Blurred vision. | Safety goggles, face shield, or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. | |
| • INGESTION | Abdominal cramps. Diarrhoea (further see Inhalation). | Do not eat, drink, or smoke during work. Wash hands before eating. | Give nothing to drink. Refer for medical attention. | |
| SPILLAGE DISPOSAL | | STORAGE | PACKAGING & LABELLING | |
| Evacuate danger area! Collect leaking and spilled liquid in sealable containers oxidants, food and feedstuffs and other packaging into closed unbreakable | | | | |

http://hazard.com/msds2/mf/cards/file/0250.html

Page 1 of 3

| as far as possible. Absorb remailiquid in sand or inert absorber remove to safe place. Do NOT away into sewer (extra persona protection: self-contained brea apparatus). | t and Dangers). Cool. Drywash all thing | and feedstuffs. F symbol T symbol R: 45-11-22-36/37/38 S: 53-45 Note: E UN Hazard Class: 3 UN Subsidiary Risks: 6.1 UN Packing Group: II Marine pollutant. | | |
|--|---|--|--|--|
| SEE IMPORTANT INFORMATION ON BACK | | | | |
| ICSC: 0250 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993 | | | | |

International Chemical Safety Cards

1,2-DICHLOROETHANE

| | ROBINE | | | | |
|-------------------------|--|--|--|--|--|
| \mathbf{I} | PHYSICAL STATE; APPEARANCE: COLOURLESS, VISCOUS LIQUID, WITH CHARACTERISTIC ODOUR. TURNS DARK | ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour, through the skin and | | | |
| M | ON EXPOSURE TO AIR, MOISTURE AND LIGHT. | by ingestion. | | | |
| P | PHYSICAL DANGERS: | INHALATION RISK: A harmful contamination of the air can be | | | |
| 0 | The vapour is heavier than air and may travel along the ground; distant ignition possible. As a | reached very quickly on evaporation of this substance at 20°C. | | | |
|] | result of flow, agitation, etc., electrostatic charges can be generated. | EFFECTS OF SHORT-TERM EXPOSURE: | | | |
| | CHEMICAL DANGERS: The substance decomposes on heating and on | The vapour irritates the eyes, the skin and the respiratory tract. Inhalation of the vapour may cause lung oedema (see Notes). The substance | | | |
| N | burning producing toxic and corrosive fumes including hydrogen chloride (ICSC # 0163) and | may cause effects on the central nervous system, kidneys, liver, resulting in impaired functions. | | | |
| [T][; | phosgene (ICSC # 0007). Reacts violently with aluminium, alkali metals, alkali amides, ammonia, bases, strong oxidants. Attacks many metals in | EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: | | | |
| _ [] | presence of water. Attacks plastic. | Repeated or prolonged contact with skin may cause dermatitis. This substance is probably | | | |
| 1 | OCCUPATIONAL EXPOSURE LIMITS (OELs): | carcinogenic to humans. | | | |
| | TLV: 10 ppm; 40 mg/m ³ (as TWA) (ACGIH 1994-1995). | | | | |
| A | | | | | |
| PHYSICAL PROPERTIES | Boiling point: 83.5°C Melting point: -35.7°C Relative density (water = 1): 1.235 Solubility in water, g/100 ml: 0.87 Vapour pressure, kPa at 20°C: 8.7 Relative vapour density (air = 1): 3.42 | Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: 13°C c.c. Auto-ignition temperature: 413°C Explosive limits, vol% in air: 6.2-16 Octanol/water partition coefficient as log Pow: 1.48 | | | |
| ENVIRONMENTAL DATA | | | | | |
| NOTES | | | | | |
| Depending on the degree | of exposure, periodic medical examination is inc | dicated. The symptoms of lung oedema often do | | | |

not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorized by him/her, should be considered.

Transport Emergency Card: TEC (R)-605 NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

ICSC: 0250

1,2-DICHLOROETHANE

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CHEM SERVICE -- DI-ISO-PROPYLBENZENE, 0-768

MATERIAL SAFETY DATA SHEET CHEM SERVICENSN: 681000N067864 Manufacturer's CAGE: 8Y898

Part No. Indicator: A

Part Number/Trade Name: DI-ISO-PROPYLBENZENE, 0-768

General Information

Company's Name: CHEM SERVICE INC

Company's P. O. Box: 3108 Company's City: WEST CHESTER

Company's State: PA Company's Country: US Company's Zip Code: 19381

Company's Emerg Ph #: 215-692-3026 Company's Info Ph #: 215-692-3026 Record No. For Safety Entry: 001 Tot Safety Entries This Stk#: 001

Status: SMJ

Date MSDS Prepared: 01SEP88 Safety Data Review Date: 28DEC95

MSDS Serial Number: CBGQN

Ingredients/Identity Information

Proprietary: NO

Ingredient: BENZENE, DIISOPROPYL-; (DI-ISO-PROPYLBENZENE)

Ingredient Sequence Number: 01 NIOSH (RTECS) Number: CZ6330000

CAS Number: 25321-09-9 OSHA PEL: N/K (FP N) ACGIH TLV: N/K (FP N)

Physical/Chemical Characteristics

Appearance And Odor: AROMATIC ODOR. COLORLESS LIQUID.

Boiling Point: 397F,203C Vapor Density (Air=1): 0.864

Solubility In Water: INSOL (IMMISCIBLE)

Fire and Explosion Hazard Data

Flash Point: 169F,76C

Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER OR WATER SPRAY.

Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL

PROTECTIVE EQUIPMENT (FP N).

Unusual Fire And Expl Hazrds: THIS IS A COMBUSTIBLE COMPOUND.

Reactivity Data

http://hazard.com/msds2/f/88/21986.html

Stability: YES

Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.

Materials To Avoid: COMBUSTIBLE. INCOMPATIBLE WITH STRONG OXIDIZING

AGENTS.

Hazardous Decomp Products: DECOMPOSITION LIBERATES TOXIC FUMES.

DECOMPOSITION PRODUCTS ARE CORROSIVE.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50(RAT):6500 MG/KG

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: CONT LENSES SHOULD NOT BE WORN IN LAB. ALL CHEMS SHOULD BE CONSIDERED HAZ-AVOID DIRECT PHYSICAL CONT! CAN CAUSE SKIN AND EYE IRRITATION. CAN BE HARMFUL IF ABSORBED THORUGH THE SKIN, INHALED AND SWALLOWED. CAN BE IRRITATING TO MUCOUS MEMBRANES.

Carcinogenicity - NTP: NO Carcinogenicity - IARC: NO Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NOT RELEVANT

Signs/Symptoms Of Overexp: SEE HEAL/IH HAZARDS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: AN ANTIDOTE IS SUBSTANCE INTENDED TO COUNTERACT EFT OF POIS. IT SHOULD BE ADMIN ONLY BY MD/TRAINED EMER PERS. MED ADVICE CAN BE OBTAINED FROM POIS CTL CTR. EYES:FLUSH CONTINUOUSLY W/ WATER FOR @ LST 15 MIN. SKIN:FLUSH W/WATER FOR 15-20 MIN. IF NO BURNS HAVE OCCURRED-USE SOAP & WATER TO CLEANSE. INHAL:REMOVE TO FRESH AIR. ADMIN OXYG IF PATIENT IS HAVING DFCLTY BRTHG. IF PATIENT HAS STOPPED (SUP DAT)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE AREA. WEAR APPROPRIATE OSHA-

REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE OR SIMILAR MATERIAL. SWEEP UP AND PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR

DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N). BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

Precautions-Handling/Storing: USE APPROP OSHA/MSMA APPRVD SFTY EQUIP. AVOID CONT W/SKIN, EYES & CLIHG. KEEP TIGHTLY CLSD & STORE IN COOL, DRY PLACE. STORE ONLY W/COMPATIBLE CHEMS.

Other Precautions: PERSONS NOT SPECIFICALLY & PROPERLY TRAINED SHOULD NOT HNDL CHEM/ITS CNINR. FURNISHED FOR LAB USE ONLY! MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL/PESTICIDAL PRODS, FOOD ADDITIVES/AS HOUSEHOLD CHEMICALS.

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR. Ventilation: THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

Protective Gloves: IMPERVIOUS GLOVES (FP N).

Eye Protection: ANSI APPRVD CHEM WORKERS GOGGS & (SUPDAT)

Other Protective Equipment: ANSI APPROVED EMERGENCY EYE WASH AND DELUGE

SHOWER (FP N).

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: FIRST AID PROC:BRTHG ADMIN ARTF RESP. IF EXHIBITING SIGNS OF SHOCK-KEEP WARM & QUIET. GET MED ATTN IF NEC. IF IN CARDIAC ARREST ADMIN CPR. CONTINUE LIFE SUPPORTING MEASURES UNTIL MED ASSISTANCE HAS ARRIVED. INGEST:CONT MD IMMED (FP N). EYE PROT:FULL LENGTH FACE SHIELD (FP N).

Transportation Data

Disposal Data

Label Data

Label Required: YES

Technical Review Date: 28DEC95

Label Status: G

Common Name: DI-ISO-PROPYLBENZENE, O-768

Chronic Hazard: NO Signal Word: WARNING!

Acute Health Hazard-Slight: X Contact Hazard-Moderate: X Fire Hazard-Moderate: X Reactivity Hazard-None: X

Special Hazard Precautions: COMBUSTIBLE. ACUTE: CAN CAUSE SKIN AND EYE IRRITATION. CAN BE HARMFUL IF ABSORBED THORUGH THE SKIN, INHALED AND

SWALLOWED. CAN BE IRRITATING TO MUCOUS MEMBRANES. CHRONIC: NONE SPECIFIED BY

MANUFACTURER.
Protect Eye: Y
Protect Skin: Y

Protect Respiratory: Y

Label Name: CHEM SERVICE INC

Label P.O. Box: 3108
Label City: WEST CHESTER

Label State: PA

Label Zip Code: 19381

Label Country: US

Label Emergency Number: 215-692-3026

CHEM SERVICE -- 7310J N-PROPYLBENZENE - LABORATORY STANDARD

MATERIAL SAFETY DATA SHEET

CHEM SERVICE AS OF January 1999

NSN: 655000F037482

Manufacturer's CAGE: 8Y898

Part No. Indicator: A

Part Number/Trade Name: 7310J N-PROPYLBENZENE

General Information

Item Name: LABORATORY STANDARD Company's Name: CHEM SERVICE INC Company's Street: 660 TOWER LN Company's P. O. Box: 3108 Company's City: WEST CHESTER

Company's State: PA Company's Country: US

Company's Zip Code: 19381-3108

Company's Emerg Ph #: 215-692-3026/800-452-9994 Company's Info Ph #: 215-692-3026/800-452-9994

Record No. For Safety Entry: 001 Tot Safety Entries This Stk#: 001

Status: SE

Date MSDS Prepared: 02JUL90 Safety Data Review Date: 07DEC94 Preparer's Company: CHEM SERVICE INC Preparer's St Or P. O. Box: 660 TOWER IN

Preparer's City: WEST CHESTER

Preparer's State: PA

Preparer's Zip Code: 19381-3108

MSDS Serial Number: BWJDW

Ingredients/Identity Information

Proprietary: NO

Ingredient: N-PROPYLBENZENE
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: DA8750000

CAS Number: 103-65-1

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS LIQUID

Boiling Point: 318.56F Melting Point: -147.1F

Solubility In Water: INSOLUBLE

Fire and Explosion Hazard Data

Flash Point: 116.6F

Extinguishing Media: CO2, DRY CHEMICAL POWDER/SPRAY.

Unusual Fire And Expl Hazrds: COMBUSTIBLE COMPOUND. SENSITIVE TO HEAT.

http://hazard.com/msds2/f/90/14287.html

Reactivity Data

Stability: YES

Cond To Avoid (Stability): HEAT.

Materials To Avoid: STRONG OXIDIZING AGENTS.

Hazardous Decomp Products: TOXIC FUMES.

Hazardous Poly Occur: NO _____

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50 (RAT/MOUSE): 6040 MG/KG

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: EYES: CAN CAUSE IRRITATION. SKIN: CAN CAUSE IRRITATION. HARMFUL IF ABSORBED. INHALATION: HARMFUL. DUST &/VAPORS CAN CAUSE RESPIRATORY TRACT IRRITATION. INGESTION: HARMFUL. CAN BE IRRITATING TO MUCOUS MEMBRANES.

Carcinogenicity - NTP: NO Carcinogenicity - IARC: NO Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE

Signs/Symptoms Of Overexp: IRRITATION.

Emergency/First Aid Proc: N-HEXANE-EYES: FLUSH CONTINUOUSLY W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NOT BURNED, WASH W/ SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. KEEP WARM & QUIET. INGESTION: DON'T INDUCE VOMITING/GIVE LIQUIDS IF UNCONSCIOUS/CONVULSIVE. IF VOMITING, WATCH CLOSELY FOR ANY AIRWAY OBSTRUCTION. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE AREA. WEAR APPRORPRIATE OSHA REGULATED FOUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR

MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

Waste Disposal Method: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN

AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS. Precautions-Handling/Storing: STORE IN A COOL DRY PLACE ONLY W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED.

Other Precautions: AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATH VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT PHYSICAL CONTACT.

Control Measures

Respiratory Protection: WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

Ventilation: CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

Eve Protection: EYE SHIELDS

Transportation Data

http://hazard.com/msds2/f/90/14287.html

Disposal Data

Label Data

Label Required: YES Label Status: G

Common Name: 7310J N-PROPYLBENZENE

Special Hazard Precautions: EYES: CAN CAUSE IRRITATION. SKIN: CAN CAUSE IRRITATION. HARMFUL IF ABSORBED. INHALATION: HARMFUL. DUST &/VAPORS CAN CAUSE RESPIRATORY TRACT IRRITATION. INGESTION: HARMFUL. CAN BE IRRITATING

TO MUCOUS MEMBRANES. IRRITATION.
Label Name: CHEM SERVICE INC
Label Street: 660 TOWER LN

Label P.O. Box: 3108 Label City: WEST CHESTER

Label State: PA

Label Zip Code: 19381-3108

Label Country: US

Label Emergency Number: 215-692-3026/800-452-9994

International Chemical Safety Cards

TETRAETHYL LEAD

ICSC: 0008

TETRAETHYL LEAD
Tetraethyl plumbane
Lead tetraethyl
TEL
Pb(C₂H₅)₄

Molecular mass: 323.45

CAS # 78-00-2 RTECS # TP4550000 ICSC # 0008 UN # 1649 EC # 082-002-00-1

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZ SYMPTO | | PREVENTION | | FIRST AID/ FIRE FIGHTING | |
|---|---|----------------|--|---|---|--|
| FIRE | Combustible. | | NO open flames. | _ | Powder, water spray, foam, carbon dioxide. | |
| EXPLOSION | Above 77°C explosive vapour/air mixtures may be formed. | | Above 77°C closed system, ventilation, and explosion-prelectrical equipment. | | In case of fire: keep drums, etc., cool by spraying with water. Combat fire out of sheltered position. | |
| EXPOSURE | | | | | IN ALL CASES CONSULT A DOCTOR! | |
| • INHALATION | Convulsions. Dizzines Unconsciousness. Vor Weakness. | | Ventilation, local exhaust, or breathing protection. | | Fresh air, rest. Artificial respiration if indicated. Refer for medical attention. | |
| • SKIN | MAY BE ABSORBED! Redness. (further see Inhalation). | | Protective gloves. Protective clothing. | | Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. | |
| • EYES | Pain. Blurred vision. | | Face shield, or eye protection combination with breathing protection. | | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. | |
| • INGESTION | Convulsions. Diarrhoe Headache. Unconscio Vomiting. Weakness. | | Do not eat, drink, or smoke d work. | ~ | Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Give plenty of water to drink. Refer for medical attention. | |
| SPILLAGE | E DISPOSAL | | STORAGE | PAC | KAGING & LABELLING | |
| expert! Ventilation. Collect leaking liquid oxid | | oxidants, acid | parated from strong is. Keep in the dark. long the floor. | packag contain T+ syn R: 26/ S: 13-1 UN Ha | Inbreakable packaging; put breakable ackaging into closed unbreakable ontainer. 1+ symbol 1: 26/27/28-33 13-26-36/37-45 IN Haz Class: 6.1 IN Pack Group: I (M) | |

http://hazard.com/msds2/mf/cards/file/0008.html

BRIX 001145

Page 1 of 2

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0008

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

TETRAETHYL LEAD

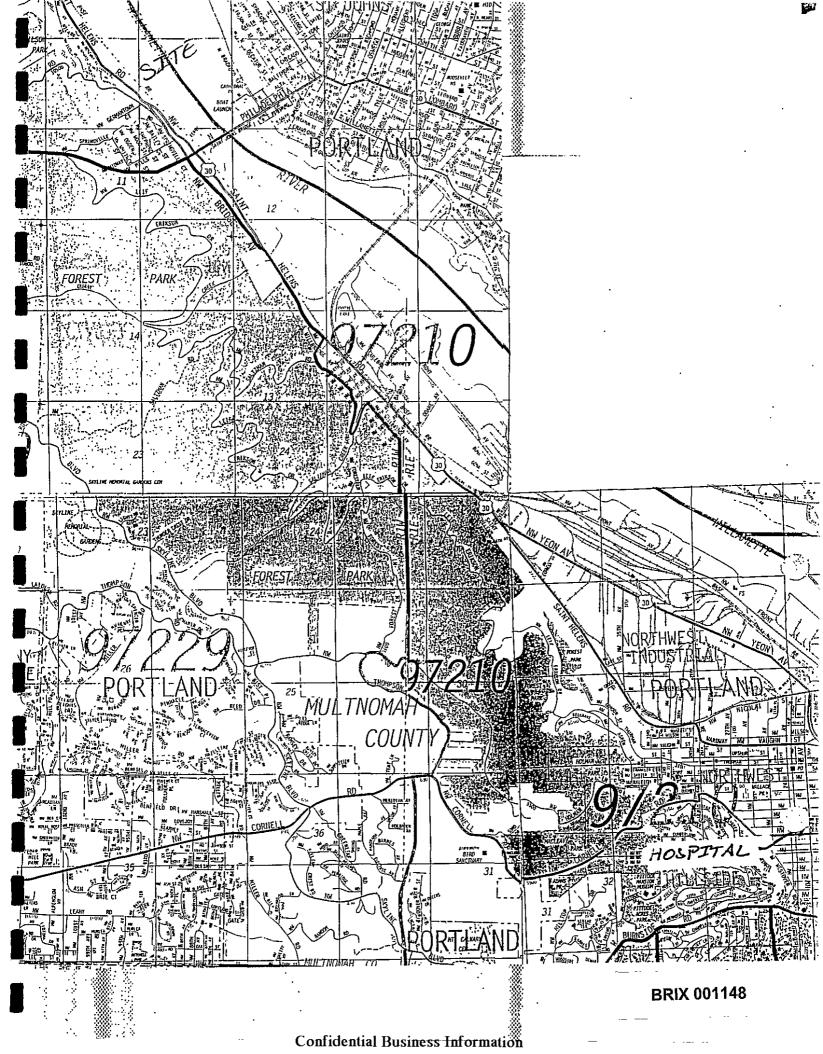
| ILIKALII | | | | | |
|--|--|---|--|--|--|
| | PHYSICAL STATE; APPEARANCE: COLOURLESS VISCOUS LIQUID , WITH CHARACTERISTIC ODOUR. | ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin, by ingestion. | | | |
| I M P O R T A N T D A T A | PHYSICAL DANGERS: The vapour is heavier than air CHEMICAL DANGERS: The substance decomposes on heating above 110°C and under influence of light producing toxic fumes: carbon monoxide, lead. Reacts violently with strong oxidants, acids, halogens, oils and fats causing fire and explosion hazard. Attacks rubber and some plastics and coatings. OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV (as Pb): ppm; 0.1 mg/m³ (skin) (ACGIH 1991-1992) PDK (as Pb): 0.005 mg/m³ P (USSR 1987) | INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C. EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes, the skin, the respiratory tract. The substance may cause effects on the central nervous system, resulting in irritability, insomnia, cardiac disorders. Exposure could cause lowering of consciousness. Exposure to high level may result in death. Medical observation is indicated. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: May cause reproductive toxicity in humans. | | | |
| PHYSICAL PROPERTIES | Boiling point (decomposes): 200°C Melting point: -136.8°C Relative density (water = 1): 1.7 Solubility in water: None Vapour pressure, kPa at 20°C: 0.027 | Relative density of the vapour/air-mixture at 20°C (air = 1): 1.00 Flash point: 77°C Auto-ignition temperature: Above 110°C Explosive limits, vol% in air: 1.8 | | | |
| ENVIRONMENTAL DATA | It is strongly advised not to let the chemical enter int | o the environment. | | | |
| | NOTES | | | | |
| Depending on the degree of exposure, periodic medical examination is indicated. The relation between odour and the occupational exposure limit cannot be indicated. Do NOT take working clothes home. Tetraethyl lead used as an anti-knock compound in gasoline also contains ethylene dibromide and ethylene dichloride as impurities. Also consult ICSC #0052. Transport Emergency Card: TEC (R)-157 NFPA Code: H3; F2; R3; | | | | | |
| ADDITIONAL INFORMATION | | | | | |
| | | | | | |
| ICSC: 0008 | © IPCS, CEC, 1993 | TETRAETHYL LEAD | | | |
| | | | | | |
| N | either the CEC or the IPCS nor any person acting on the which might be made of this information. This could | pehalf of the CEC or the IPCS is responsible for the | | | |

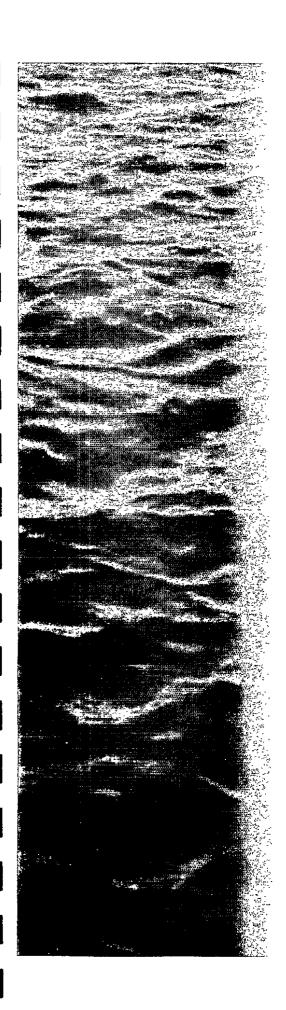
IMPORTANT LEGAL NOTICE:

Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

ATTACHMENT B

Hospital Map





SAMPLING RESULTS REPORT IN SUPPORT OF THE PRELIMINARY ASSESSMENT OF THE BRIX MARITIME COMPANY FACILITY

Prepared for:

Brix Maritime

Prepared by:

Anchor Environmental and Hahn & Associates

September 2001

SAMPLING RESULTS REPORT IN SUPPORT OF THE PRELIMINARY ASSESSMENT OF THE BRIX MARITIME COMPANY PROPERTY

Prepared for

Brix Maritime Company

Prepared by

Anchor Environmental, L.L.C.

and

Hahn and Associates, Inc.

September 2001

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Sampling Results Report

Brix Maritime Site

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BRIX 001153

99-056-01

INTRODUCTION 1

This report presents the results of the soil and groundwater sampling and analysis program conducted in May-June 2001 at the Brix Maritime Company (Brix Maritime) property located at 9030 Northwest St. Helens (Site) (Figure 1). The sampling and analysis program was undertaken to fulfill requests by the Oregon Department of Environmental Quality (DEQ) for additional information on the potential presence of constituents in soils and groundwater on the Site as described in DEQ's letter to Brix Maritime dated December 19, 2000. DEQ stated in 1999, and on numerous occasions since that time, that the primary purpose of the information and sampling requests was to determine whether the Site might be a source of constituents to the river. The sampling results discussed in this report augment and should be read in conjunction with existing information on the Site already provided to DEQ in the Expanded Preliminary and Supplemental Preliminary Assessments (Anchor 2000) conducted by Brix Maritime in February 2000 and October 2000, respectively.

This report includes a general review of site characteristics and history in Section 2 (Background). Detailed background and site information can be found in the Supplemental Preliminary Assessment (Anchor 2000). Sampling and analytical methods and results are presented in Sections 3, 4, and 5. DEQ also requested in the December 19, 2000 letter that Brix Maritime present additional information on any hazardous materials at the Site. Section 6 provides a description of materials used and/or generated at the Site. Based on the sampling results presented in Section 5, a risk assessment for upland human health following DEQ Guidance (DEQ 1999) is presented in Section 7. Section 8 provides a conservative preliminary risk screening of nearshore groundwater constituent concentrations to determine whether these concentrations might pose potential risks to river receptors. Site and chemical-specific characteristics are also evaluated in Section 8 to determine whether the Site is a source of constituents to the river. Conclusions are presented in Section 9.

The Supplemental Preliminary Assessment, the Expanded Preliminary Assessment, and this report together fulfill Brix Maritime's agreement to perform a preliminary assessment under its December 1999 Voluntary Cleanup Letter Agreement with DEQ. These reports, taken together, satisfy and/or exceed the requirements for a preliminary

1

assessment as defined by OAR 340-122-0115(41) and provide the information described in DEQ guidance. When read together, these reports conclude that past and present operations at the Site do not pose a risk to present and future public health, safety, welfare and the environment, that the Site is not a source to the river, and that no additional investigation or remedial action is required.

2 BACKGROUND

Site Description 2.1

Site Location

The Site is located at 9030 NW St. Helens Road, Portland, Oregon, Township 1 North, Range 1 West, Section 11, Tax Lot 800. The Site is bordered to the northeast by the Willamette River, to the southwest by railroad tracks and NW St. Helens Road, to the northwest by a bulk fuel storage facility, and to the southeast by industrial use property (Figure 2).

2.1.2 Site Features

The Site consists of approximately 3.7 acres with two primary structures: an office building and a maintenance building. A covered "work barge" associated with the property is moored on the Willamette River. The topography at the Site is generally level with elevations of approximately 30 feet above mean sea level (msl) at the southwest property boundary to 20 feet msl at the top of the river bank in the northeast portion of the property. The Site is entirely developed and covered with asphalt, concrete, or buildings, with the exception of a steep riverbank sloping down to the Willamette River that is protected by rip-rap.

2.1.3 Site History

Information on the history of the Site is included in the Supplemental Preliminary Assessment Summary Report (Anchor 2000). However, some information in the report requires clarification on the ownership and operation of the Site. The property was vacant and undeveloped prior to 1979, at which time Brix Maritime, a Delaware corporation, developed the property for use as a dispatch and coordination office for a tugboat fleet. In 1993, Brix Maritime became a wholly-owned subsidiary of Foss Maritime Company, a Washington corporation. Brix Maritime continues to own and operate the property under a license allowing Brix Maritime to use the Foss name. Foss Maritime Company does not own or operate the property, although the Foss name is displayed at the

BRIX 001155.01

99-056-01



Site under the license granted to Brix Maritime¹. The use of the property has remained the same since site development; it is currently, and has always been, used for tug mooring, maintenance, fueling, and crew rotation.

2.2 Regulatory History

Prior to 1998, the regulatory history for the Site is limited to issues related to the permitting, construction and decommissioning of the several Underground Storage Tanks (USTs) used to hold light petroleum products including diesel, gasoline, and lubrication oil. In 1993, a release was reported to DEQ related to these USTs and a soil remediation was undertaken. Brix Maritime's policy is to report any and all spills observed in or near the river regardless of the source. As a result, several spills and sheens have been reported in the vicinity of the property, including those observed coming from the City of Portland's storm water outfall at the Site, many of which were not associated with Brix Maritime's property or its operations. The City outfall is a potential source of petroleum constituents typical of urban runoff.

In 1998, the Site was identified by the DEQ as a potential source of constituents to the Willamette River sediments based on the Portland Harbor Study (EPA 1998). Since that time, the following information requests and submittals were made regarding the potential presence of constituents at the Site and whether any such constituents pose a risk to public health, safety, welfare or the environment or are a source to river sediments:

- 1) March 3, 1999 DEQ requested information on the Site
- 2) March 31, 1999 Brix Maritime provided the requested information
- 3) November 19, 1999 DEQ requested that Brix Maritime enter into a Voluntary Cleanup Letter Agreement to perform a preliminary assessment
- 4) December 1999 Brix Maritime agreed to perform a preliminary assessment and initiated an Expanded Preliminary Assessment
- 5) February 2000 Brix Maritime submitted the Expanded Preliminary Assessment (Anchor 2000)

¹ The use of the Foss name under license to Brix has previously caused confusion over the ownership and operation of the Site. The Site is operated by Brix Maritime and record title to the property comprising the Site remains in Brix Maritime's name.

- 6) April 20, 2000 DEQ requested additional information
- 7) October 2000 Brix Maritime submitted a Supplemental Preliminary Assessment with additional information (Anchor 2000)
- 8) December 19, 2000 DEQ requested yet another round of information on hazardous materials used or generated at the Site and site sampling
- 9) January 17, 2001 Brix Maritime advised DEQ that they had received a general notice letter from EPA and were participating in efforts to address the Portland Harbor Superfund site
- 10) May 2001 Brix Maritime submitted a Work Plan to DEQ for on-site sampling
- 11) Late May-Early June 2001 Brix Maritime conducted extensive sampling of soils and groundwater at the Site (sampling plan described in HAI 2001)
- 12) June 27, 2001 Brix Maritime met with DEQ to present the preliminary results of the on-site sampling program

DEQ stated in 1999, and on numerous occasions throughout the above requests, that the primary purpose of the information and sampling requests was to determine whether the Site might be a source of constituents to the river. Some of the information summarized and collected since 1999 has been relevant to the site history and subsequent remediation of the soils around USTs. However, at no time has Brix Maritime requested or sought official closure of either existing or previously removed USTs. All investigations have been conducted with the sole purpose of answering DEQ's questions regarding the Site as a potential source to the Willamette River.

2.3 Previous Reporting Results

The primary reports submitted to DEQ regarding the Site as a potential source to the river were the Expanded Preliminary Assessment and the Supplemental Preliminary Assessment (Anchor 2000). The Expanded Preliminary Assessment presented existing information on USTs, outfalls, adjacent site uses, and nearby Willamette River sediment quality and evaluated the potential pathways to the river. It was concluded from this information that potential pathways to the river do not exist.



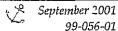
The Supplemental Preliminary Assessment examined the site history, potential chemical sources, and potential pathways to the river in more detail as requested by DEQ. This report further supported the conclusions of the previous report. In particular, it was found that there was no soil or groundwater contamination that had any reasonable prospect of migrating to the river via ground or surface water. Further, previous releases associated with the USTs had been localized to upland soils, which were the subject of soil remediation activities undertaken in 1993. Again, it was concluded that further investigations of the Site as a potential source to the Willamette River were not warranted.

2.4 Existing Sediment Quality Data

As noted above, the Expanded and Supplemental Preliminary Assessments (Anchor 2000) concluded that the Site was not a source to river sediments. Further, the Expanded Preliminary Assessment reviewed the sediment concentrations of polycyclic aromatic hydrocarbons (PAHs) in nearby river sediments and DEQ evaluations, and found that this information does not indicate the Site is a source.

Sediment PAH concentrations were screened against National Oceanic and Atmospheric Administration (NOAA) Upper Effects Thresholds (UETs), which are set at 5,300 and 6,500 μ g/kg for Low molecular weight PAHs (or LPAHs) and High molecular weight PAHs (or HPAHs), respectively. Similarly, total PAH (TPAH) concentrations were compared to consensus-based sediment quality guidelines developed by MacDonald et al. (2000), which include a Threshold Effects Concentration (TEC) and Probable Effects Concentration (PEC) set at 1,610 and 22,800 μ g/kg TPAH, respectively.

The discussion of these sediment quality guidelines does not imply any form of agreement with technical basis by which they were developed or agreement with the spatial extent of sediments that may require cleanup or form the basis of Natural Resource Damage claim. These sediment guidelines are being used for screening level purposes only.



The closest available downstream surface sediment sampling site (SD052) had concentrations of LPAHs at 803 $\mu g/kg$ and HPAHs at 3,907 $\mu g/kg$, which are well below the UETs. Station SD052 is just downstream of the northeast corner of the Site. If the Site were or had been a source of PAHs, this station would be an ideal location for detection of these sources. That is, stations further downstream would less likely to be affected by any potential source from the Site and more likely to be affected or influenced by other sources along the shoreline.

In addition, the types and proportions of PAHs (e.g., ratio of LPAHs to HPAHs) present in sediments downstream of the Site (with SD052 being most applicable) are not characteristic of petroleum sources at the Site. Two general sources of PAHs in urban environments are widely recognized:

Pyrogenic – having an origin associated with significant heating or organic matter. This process results in PAH mixtures enriched in higher molecular weight compounds. Examples include by-products of coal gasification and coal tar distillation, fuel combustion products found in urban runoff and fallout, and fires. Urban runoff is a significant source of pyrogenic PAHs to urban waterways and is associated with outfalls that discharge urban storm water runoff from non-point sources in watersheds.

Petrogenic – having origin associated with crude oil or refined petroleum products. These PAH mixtures are enriched in lower molecular weight compounds. Examples include crude oil, bunker C, diesel fuel, gasoline, and incomplete combustion residues of these fuels.

In terms of the volume and use of materials at the Site, petrogenic PAHs (primarily from lubrication oil, diesel fuel, and to a lesser extent gasoline) would be the most likely constituents that could be associated with past and present operations at the Site. Petrogenic PAHs tend to be dominated by LPAHs, particularly 2- and 4-ring PAHs (Battelle 1998). The typical ratio of LPAH/HPAH in petrogenic materials ranges from 4 (bunker C) to 846 (gasoline), with crude oil having a ratio of approximately 25 (Battelle 1998). However, pyrogenic PAHs (those from



combustion, fire, or coal conversion) have LPAH/HPAH ratios that range from 0.02 (pitch) to 2.7 (creosote) (Battelle 1998).

The LPAH/HPAH ratio at SD052, just downstream of the Site, is 0.2. This ratio is not indicative of petrogenic sources of PAHs. Rather, this ratio appears to be more consistent with the ratio typically found for urban storm water runoff and/or other pyrogenic sources.

2.5 **UST Operational and Release History**

2.5.1 Operational History

Five USTs are known to have been used at the Site, two of which were decommissioned by removal (USTs #1 and #2) in December 1998. The five USTs were installed in 1979 in a single tank nest located adjacent to the maintenance building (Figures 2 and 3). The DEQ Facility Identification Number is #7374. The five USTs included two 20,000-gallon capacity diesel fuel tanks (UST #4 and UST #5), two 6,000-gallon capacity lubrication oil tanks containing 30-weight and 40-weight oil, respectively (UST #1 and UST #3), and one 2,000-gallon capacity gasoline tank (UST #2). All of the tanks and piping were constructed of singlewall steel at the time of installation.

USTs #1, #3, #4, and #5 were piped to the covered maintenance barge to service watercraft. Transfer pipes ran underground from the UST system, daylighted along the riverbank, and ran directly over water to the work barge. UST #2 had been utilized for refueling of company vehicles; all piping to this tank ran underground to a fuel dispenser located adjacent to the west corner of the maintenance building.

In 1998, Ulrich Industrial Coatings decommissioned USTs #1 and #2 by removal and upgraded USTs #3, #4, and #5. During these activities, the fueling lines were re-routed to their current configuration (Figure 4). The UST permitting and decommissioning documentation, as well as the UST upgrade documentation, are attached to the Supplemental Preliminary Assessment as Appendix E and F, respectively (Anchor 2000).

2.5.2 Release History

Two releases of petroleum products have been documented at the Site, both relating to the UST system, which were reported under DEQ leaking UST File No. 26-93-0009.

In 1993, a lubricating oil release was reported to DEQ relating to a hole discovered in a 30-weight lube oil transfer line next to the UST nest. At that time, soil removal activities were conducted and approximately 60 feet of each of the steel UST product lines were removed and replaced with fiberglass piping (Hahn and Associates, Inc. [HAI] 1993a). Approximately 50 cubic yards of soil were removed during the excavation activities. Subsurface investigations conducted by HAI (HAI 1993b) in the vicinity of the tank nest detected gasoline, diesel, and oil-range petroleum hydrocarbons in soil; however groundwater was not tested at the time. A total of 13 soil borings (B-1 through B-13; Figure 4) were installed at the Site; the results of soil testing relating to the 1993 soil removal and subsurface investigations are detailed in the Supplemental Preliminary Assessment (Anchor 2000)

In 1998, during tank upgrading activities, petroleum-hydrocarbons were encountered in soil potentially due to an overfill at either UST No. 4 or No. 5; however, the specific tank was not documented. Soil samples were not collected to confirm the observed findings but the potential release was reported to DEQ.

3 FIELD METHODS

Subsurface soils and groundwater sampling was conducted throughout the Site in May 2001 to provide additional information to DEQ that confirms that the Site is not (and has not been) a potential source of constituents to the river.

3.1 Push Probe Installation

Sampling followed the procedures in the investigation Work Plan (HAI 2001). Seventeen push probe borings (B-14 through B-30) were installed during the investigation of the UST area to depths ranging from 4 to 32 feet below ground surface (bgs) (Figure 4). Groundwater samples were collected from six of the borings (B-14, B-15, B-17, B-18, B-19, and B-20). A groundwater sample was attempted at B-16, however the boring was dry.

Borings B-14 through B-20 were installed surrounding the UST and piping areas to characterize the extent of potential petroleum compounds in soil and to sample groundwater for the presence of petroleum compounds. Push probe locations B-19 through B-26 were placed in close proximity to UST and piping areas to better define the vertical extent of petroleum impacted soil, and to collect risk parameter data. Borings B-27 through B-29 were located in previously-identified and remediated release areas to better define the vertical extent of potential petroleum compounds in soil and to collect "worst case" samples for a risk parameter analysis. Since the locations of B-27, B-28, and B-29 were located in areas of current operating USTs and piping, these areas were excavated by hand to uncover tank piping, prior to initiating push probe sampling. Based on field screening observations, one additional push probe (B-30) was installed southwest of B-21 at the former gasoline dispenser area to further characterize field-identified potential petroleum impacts.

The push probes were installed by Geo-Tech Explorations, Inc. (Geo-Tech) of Tualatin, Oregon. Because of limited access at the Site due to low overhead in the on-site structure, one push probe boring (B-26) was installed by a hand-operated Bosch Roto-Hammer® hydraulic hammer unit. The remaining sixteen push probe borings were installed by Geo-Tech with a truck-mounted Geo-Probe Systems®



hydraulic hammer unit equipped with a 1.5-inch outside diameter (OD) hydraulically-driven steel rod.

Following completion of the sampling activities, the borings were backfilled with granular bentonite to within one foot of the ground surface and brought to grade with concrete or asphalt to match the surrounding land surface.

3.2 Soil Sampling Activities

Continuous soil cores were collected from the Roto-Hammer boring using a 1.0-inch OD stainless steel sampler with Teflon-lined sleeve that was advanced 2 feet into the undisturbed soils. Continuous soil cores were collected from Geo-Probe borings using a 2-inch OD stainless-steel Macrocore device utilizing a disposable polyvinyl chloride (PVC) sleeve that was advanced 4 feet into the undisturbed soils. Soil samples for analysis were collected from cores at approximate 2- to 4-foot intervals.

Upon collection, each soil sample was immediately placed in a 9-ounce sample jar and capped with a Teflon-lined lid. The sample jars were then labeled and transferred to a chilled container for shipment to the analytical laboratory. Standard sampling protocols, including the use of chain-of-custody documentation, were followed for all sampling procedures. The properties of each soil core were noted by an HAI scientist in the field. A summary of the May 2001 push probe installations is included as Table 1; and the boring logs are included in Appendix A. Boring logs for B-1 through B-13 installed during the April 1993 subsurface investigation are also included in Appendix A.

Each soil core was screened in the field for the presence of constituents by the visual, olfactory, sheen, and headspace vapor methods. The presence of sheen was assessed by placing clean tap water in a black pan and introducing approximately 5 grams of disaggregated soil to the water. Screening for the presence of organic vapors was conducted by the headspace method using a photoionization detector (PID) equipped with a 10.6 ev lamp. Immediately following the collection of the sample, approximately 4 ounces of soil were placed in a one-quart plastic bag and sealed. The sample was set aside for a 20-minute stabilization period, whereupon the

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detector probe was inserted through the seal into the bag to collect the headspace sample. The results of the headspace screening are recorded on the boring log in parts per million (ppm). The results of the headspace method were used for qualitative screening purposes only.

3.3 **Groundwater Sampling Activities**

Groundwater samples were collected from temporary well points installed in B-14, B-15, B-17, B-18, B-19, and B-20 (Figure 4). Groundwater was not encountered in recoverable quantities at B-16, and only very low quantities were encountered at B-14. To collect the groundwater samples, a 4-foot section of 1-inch OD, 0.010-inch slotted, stainless steel well screen was set beneath the groundwater level. Specifically, well screens were placed across a depth interval of 24 to 28 feet bgs in all probes sampled, with the exception of B-14 where the screen was placed across a depth interval of 28 to 32 feet bgs.

The well points were typically purged of one liter of water or purged dry prior to sampling. The water samples were collected with disposable polyethylene bailer tubing for volatile compounds and a vacuum pump for PAHs and dissolved (field filtered) lead. Sampling containers were completely filled such that no headspace was present that would allow for the loss of volatile compounds. The sample bottles were then labeled and transferred to a chilled container for shipment to the analytical laboratory.

Following completion of the water sampling activities, the temporary well point was removed, and the boring abandoned.

3.4 **Decontamination Procedures**

Soil sampling equipment was decontaminated between soil samples with a detergent wash followed by a double-rinse with potable water. All push probes, including temporary well point screens, were steam-cleaned between probe locations to prevent cross-contamination.



Reusable groundwater sampling equipment was decontaminated between groundwater samples by steam-cleaning. Where new disposable equipment was used for sample collection, decontamination was not necessary.

4 ANALYTICAL METHODS

The soil and groundwater samples were transported to Environmental Services Laboratory, Inc. of Portland, Oregon for analytical testing. Selected soil samples were analyzed per the Work Plan (HAI 2001) for the following parameters:

- Gasoline-Range Total Petroleum Hydrocarbons (TPH) NW TPH-Gx
- Diesel-Range TPH NW TPH-Dx
- Oil-Range TPH NW TPH-Dx
- Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) EPA 8260B or 8021
- Volatile Organic Compounds (VOCS) EPA 8260B
 - methyl-tert-butyl-ether (MTBE)
 - ethylene dibromide (EDB)
 - ethylene dichloride (EDC)
 - 1,2,4-trimethylbenzene (1,2,4-TMB)
 - 1,3,5-TMB
 - iso-propylbenzene
 - n-propylbenzene
 - naphthalene
- PAHs EPA 8270 SIM
- Total Lead EPA 6010.

Selected groundwater samples were analyzed per the Work Plan (HAI 2001) for all of the same parameters analyzed in soils (using the same methods) except gasoline, diesel, and oil range TPH.

5 RESULTS AND DISCUSSION

The results of the analytical testing for soil samples from the 1993 test pit and subsurface investigation activities are summarized on Tables 2 and 3, and for the 2001 subsurface investigation are summarized on Tables 4 and 5. The results of the analytical testing of the groundwater samples are summarized in Table 6. The laboratory reports and chain-of-custody documentation for soil and groundwater samples are in Appendices B and C, respectively.

5.1 Subsurface Conditions

As observed during the January test pit investigation as well as April 1993 and May 2001 subsurface investigations, the shallow soils at the Site are composed typically of gravel with varying mixtures of sand and silt (Gravel Fill Unit) from the surface to depths of approximately 1 to 6 feet bgs. Underlying the Gravel Fill, sands and silty sands (Sand Fill Unit) were observed to depths of between 20 and 25 feet bgs where a native silty clay (Silty Clay Unit) was encountered to the maximum depth of subsurface investigation at approximately 32 feet bgs. A native sand zone was observed beneath the Silty Clay Unit at some locations (B-19, B-22, and B-26). Concrete and gravel fill material was observed in four borings (B-1, B-8, B-18, and B-26) that were installed inside the maintenance building. The concrete material at B-1 and B-8 prevented investigations deeper than 5 feet bgs.

During the April 1993 subsurface investigation, groundwater was observed at depths between 23.5 and 26 feet bgs. During the May 2001 subsurface investigation, groundwater was encountered at depths between 23 and 32 feet bgs; no groundwater was found to be perched in the Sand Fill Unit. Based on groundwater contaminant plume distribution (see Section 5.3), the direction of net groundwater flow beneath the site is inferred to be toward the northeast.

5.2 Soil Sample Results

5.2.1 Total Petroleum Hydrocarbons

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The investigation activities conducted at the Site detected gasoline-range, diesel-range, and oil-range petroleum hydrocarbons in soils at selected locations at depths of 3 to at least 24.5 feet bgs. Detected gasoline concentrations range

between 1.14 to 2,000 ppm (Tables 3 and 4). Combined diesel and oil-range petroleum hydrocarbons ranged between 49 and 53,000 ppm (Tables 2, 3, and 4).

The testing results suggest two areas where petroleum hydrocarbons were detected: the former gasoline dispenser area and the former oil pipeline area. The analytical results indicate the presence of gasoline in soil is laterally and vertically defined and limited to an area in the immediate vicinity of the former gasoline dispenser, a small portion of which may extend beneath the west corner of the maintenance building. Field screening and analytical results indicate the extent of diesel-range and oil-range petroleum hydrocarbons are laterally and vertically defined and located in the vicinity of the former oil pipeline area (Figure 5). Petroleum hydrocarbon impacts appear to have been limited to shallower subsurface soils located in the Gravel Fill and Sand Fill Units at the Site.

5.2.2 Petroleum Constituents

Gasoline petroleum constituents (BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, npropylbenzene, and iso-propylbenzene) and additives (MTBE, EDB, EDC, and lead) were compared to DEQ's most conservative Risk-Based Concentrations (RBCs) for occupational pathways (OAR 340-122-0244) as outlined in the DEQ Risk-Based Decision Making (RBDM) guidance document (ODEQ 1999). Likewise, diesel and oil-range petroleum constituents (PAHs) were also compared to DEQ occupational RBCs.

Gasoline petroleum constituents were generally not detected in the "worst case" soil sample from the gasoline dispenser area, with the exception of certain VOCs in two borings (B-21 @ 5.0 feet and B-25 @ 6.0 feet bgs), and total lead in all samples where analyzed. Where detected, VOC constituents were below their respective lowest occupational RBCs with the exception of benzene, which was detected at 5.2 ppm (B-21 @ 5.0 feet bgs). This is not surprising since this sample contained the highest gasoline concentration (1,370 ppm) detected at the site during the May 2001 sampling event. PAHs were not detected in the four soil samples analyzed for these constituents. Although total lead was detected at



concentrations ranging from 3.03 to 4.4 ppm, these concentrations are considered to be representative of natural background levels.

Petroleum constituents detected above the most-stringent occupational and trench worker RBCs were carried forward for further evaluation based on DEQ reasonably-likely land use exposure pathways. Discussion of reasonably-likely soil exposure pathways is presented in Section 7.2.

5.3 **Groundwater Sample Results**

Groundwater sample results for applicable petroleum constituents and additives (BTEX, 1,2,4-TMB, 1,3,5-TMB, n-propylbenzene, iso-propylbenzene, MTBE, EDB, EDC, PAHs and lead) were compared to DEQ's most conservative RBCs for occupational pathways. Petroleum constituents were detected in 5 of 7 groundwater samples analyzed (Table 6; Figure 6). Benzene, iso-propylbenzene, n-propylbenzene, 1,2,4-TMB, 1,2,5-TMB, naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were detected above their moststringent occupational RBCs at B-17 and B-18 only. The vast majority of the detections above RBCs occurred at B-17. Petroleum constituents detected above the most-stringent occupational RBCs were carried forward for further evaluation based on reasonably-likely groundwater exposure pathways. Discussion of reasonablylikely groundwater exposure pathways is presented in Section 7.2.



6 HAZARDOUS MATERIALS INFORMATION

In response to the Supplemental Preliminary Assessment (letter dated December 19, 2000), DEQ made several comments requesting additional information on the potentially hazardous materials used and generated on the Site. Waste paint and oil are the only potentially hazardous materials that have been generated at the Site between the time of site development in 1979 and the time Brix Maritime became a wholly-owned subsidiary of Foss Maritime Company. Currently, Brix Maritime implements strict inventory controls to ensure that all paint purchased at the Site is used and no waste paint is generated. The only potentially hazardous material generated by Brix Maritime, since it became a wholly-owned subsidiary of Foss Maritime, is waste oil. The information requested is contained in the following sections.

6.1 Conditionally Exempt Small Quantity Generator Status

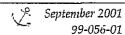
In 1994, Brix Maritime disposed of old paint that had been accumulating at the Site over the years, prior to Brix Maritime becoming a wholly-owned subsidiary of Foss Maritime, at an off-site disposal facility. As a result of that one disposal event, it was listed as Conditionally Exempt under the Resource, Conservation and Recovery Act (RCRA). To Brix Maritime's knowledge, hazardous wastes have not been generated since site development in 1979 and, except for the waste paint disposed of in 1994, Brix Maritime is not and has not been a generator under RCRA, conditionally exempt or otherwise.

Brix Maritime does not handle, store, treat, generate or dispose of hazardous waste at the Site. Currently, Brix Maritime implements rigorous inventory control and procedures to control the use and distribution of paint on vessels. All paint purchased for use is used in its entirety with no waste generated. Brix Maritime does not foresee any changes to its operations at the Site that would necessitate a return to or need for generator status in the future.

6.2 Types of Materials Used on Site

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The primary materials stored and used on site are diesel fuel and lubrication oil (new and waste). The storage and recycling of these products is discussed in detail in the Supplemental Preliminary Assessment Summary Report. Table 7 summarizes



the types, storage locations, and average quantities of various others materials used in small quantities on site. These include: hydraulic fluid, antifreeze, paint, and paint thinner, gasoline, kerosene, Nalcool, 40 weight oil, and AC 500 (an acid based cleaner). All of these materials are stored in doors and/or undercover to prevent any exposure to rain or storm water runoff. All of these materials are properly used and disposed of to prevent contamination to soils and surface waters. In many cases, these materials are used in their entirety so that disposal is not required including paints, diesel fuel, gasoline, and cleaners. Excess kerosene and oils are recycled.

6.3 Lubrication Operations

Waste lubrication oil at the facility is currently pumped on board the shop barge, where an aboveground oil/water separating system is used. Oil that is not mixed with water is pumped directly into the waste oil tank on site. The bilge/oily water is pumped into an aboveground oil/water separating tank where the oil is separated from the water. Separated water is pumped into the city sewer. The volume of this water is not tracked. The waste oil tanks are pumped out on an average of approximately once a month, yielding about 2000 gallons each time. Waste oil is trucked off-site for recycling.

6.4 Drum Storage

Drums of lube oil for two vessels are delivered to the Site on a periodic basis. The drums are delivered, emptied for use in the vessels and then picked up within a few days by the vendor for reuse. Emptied drums are stored indoors until they are picked up by the vendor. Occasionally, a drum of kerosene is delivered and used on the Site in the shop and is usually returned within a couple of days of purchase. A total of approximately 170 lube oil and kerosene drums are received and returned to vendors per year. Used oil filters are placed in sealed drums and are under cover at all times. These drums are periodically picked up for recycling. Approximately 4 to 5 oil filter drums are present on site at any one time.

6.5 Discussion BRIX 001171

The only potentially hazardous materials generated on the Site in any substantial quantities are waste oil and water separated from bilge/waste oil. Because waste oil

is recycled and water is pumped to the city sewer, there is little if any potential for loss of these materials to either the Site or the river. As discussed in Section 2.4, the materials on site are all relatively light weight petroleum products that cannot be a source of higher weight PAHs (which typically come from pyrogenic sources) found in river sediments.

BRIX 001172

September 2001 99-056-01

Brix Maritime Site

7 RISK-BASED UPLAND EVALUATION

A risk-based evaluation was conducted for the Site according to DEQ's Risk-Based Decision Making (RBDM) guidance document (ODEQ 1999) to determine potential human health risks associated with petroleum impacts to the property. The evaluation is organized and presented under the following primary headings: beneficial use evaluation (Section 7.1), conceptual site exposure model (Section 7.2), and risk evaluation (Section 7.3).

7.1 Beneficial Use Evaluation

7.1.1 Reasonably-Likely Land Uses

The approximately 3.7-acre property is zoned as "IH" for Heavy Industrial. The property has two overlay zones: interim resource protection zone (i) and scenic resource (s). With respect to current uses, the Site is wholly operated by Brix Maritime. Surrounding adjacent properties are zoned "IH" Heavy Industrial with an "i" overlay. There is no reason to believe the Site or adjoining property uses will change in the future. Accordingly, industrial use is carried forward in the risk evaluation as the current reasonably-likely and future land use for the property.

7.1.2 Reasonably-Likely Beneficial Uses of Groundwater

Currently, tap water at the subject property and adjoining properties is supplied by the City of Portland. No water wells are present on the subject property. Given the historical presence of municipal water service for this area of Portland, it is unlikely that any water wells are in use by nearby properties for domestic purposes. According to the property owner, groundwater at the Site is not expected to be used in the future.

BRIX 001173

Hahn and Associates, Inc. (HAI) conducted a water well inventory for the area within a one-half-mile radius of the Site to determine the usage of groundwater. The search area was not extended across the Willamette River to the northeast since this feature is considered a hydrogeologic boundary. The well inventory was based on well logs filed with the Oregon Water Resources Department (OWRD). The search of the OWRD well log database was conducted using the

OWRD's Web-based GRID query. A door-to-door survey was not conducted to identify undocumented water wells.

One water well was identified within a one-half mile of the Site that was installed for domestic consumptive purposes. The well was installed in 1990 and is located approximately 2,000 feet southwest (up-gradient) of the Site (Appendix D). The well was installed to a depth of 530 feet bgs with a static water level recorded at 450 feet bgs. Based on the well's distance and up-gradient location, it is unlikely that this well could be impacted by the Site. Based on the preceding, the use of groundwater as a drinking water source will not be carried forward in the risk evaluation.

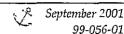
7.2 Conceptual Site Exposure Model

The conceptual site exposure model for the Site was developed based on the current and future reasonably-likely land and groundwater uses identified for the Site and surrounding properties as discussed in Section 7.1.

The conceptual site exposure model describes the migration pathways and exposure scenarios (potentially exposed populations and exposure routes) through which humans may be exposed to constituents of potential concern at the Site. No exposure, and thus no potential for risk, exists unless an exposure pathway is complete. The site exposure model presented herein is based on the identified soil and groundwater conditions, as well as current and reasonably-likely future land uses and beneficial uses of groundwater within the locality of the Site.

7.2.1 Constituent Sources and Exposure Media

The release mechanism at the Site relates to two primary impacted areas: the former gasoline dispenser and former underground oil pipeline. The residual petroleum-impacted soil is present at depths of approximately 3.0 to 24.5 feet bgs. For purposes of this risk evaluation, the identified exposure media are surface soil (0 to 3.0 feet bgs), subsurface soil, and groundwater.



7.2.2 Constituents of Potential Concern

Benzene, detected at 5.2 ppm (B-21 @ 5.0 feet bgs), was the only petroleum constituent in soil that exceeds the most-stringent RBCs for occupational exposure. Concentrations of lead appear to be representative of natural background levels. For example, it is worth noting that the 90th percentile background concentration reported for lead in Clark County, Washington is 24 ppm and for the entire state of Washington is 17 ppm (Ecology 1994). This would indicate that lead concentrations at the Site are well below commonly found background levels of lead in soils. Benzene and lead are carried forward for risk evaluation.

Groundwater constituents that were detected above their most-stringent occupational RBCs include benzene, iso-propylbenzene, n-propylbenzene, 1,2,4-TMB, 1,2,5-TMB, naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. Accordingly, these constituents in groundwater are carried forward for risk evaluation.

7.2.3 Exposure Pathway Analysis

Nine exposure pathways for soil and groundwater, as outlined in the DEQ RBDM guidance document (ODEQ 1999), were evaluated for applicability to the Site, including:

- Soil
 - 1) Surface soil ingestion, dermal contact, and inhalation
 - 2) Volatilization to outdoor air
 - 3) Vapor intrusion into buildings
 - 4) Leaching to groundwater
- Groundwater
 - 5) Groundwater ingestion
 - 6) Groundwater volatilization to outdoor air
 - 7) Groundwater vapor intrusion into buildings
 - 8) Ingestion and inhalation from tap water
 - 9) Groundwater in excavation.



Table 8 lists the various exposure pathways/receptor scenarios that were evaluated for the Site, and briefly explains the rationale for the selection or exclusion of each exposure pathway. Since the beneficial land use evaluation indicates the current and reasonably likely future land uses within the vicinity of the subject property to be industrial, the occupational receptor scenario was utilized for the applicable exposure pathways. In addition, the excavation worker scenario was included for soil only due to the relatively shallow depth of some detected constituents in soils (i.e., about 3 foot bgs). Groundwater was not included in the excavation worker scenario since it is too deep (over 23.5 feet bgs) for excavation worker exposure. All exposure pathways involving groundwater ingestion were eliminated since petroleum constituents in groundwater at the Site are not deemed to reasonably likely impact current or future beneficial uses of groundwater for consumptive purposes. As shown in Table 8, the following six exposure pathways/receptor scenarios were retained for further evaluation:

Soil

- Surface soil ingestion, dermal contact, and inhalation by an occupational worker
- 2) Surface soil ingestion, dermal contact, and inhalation by an excavation worker
- 3) Volatilization to outdoor air for an occupational receptor
- 4) Vapor intrusion into buildings for an occupational receptor

Groundwater

- Groundwater volatilization to outdoor air for an occupational receptor
- 6) Groundwater vapor intrusion into buildings for an occupational receptor.

BRIX 001176

7.3 Risk Evaluation

The evaluation of potential unacceptable risks at the Site was conducted by comparing the maximum detected concentration for each constituent of potential concern to the RBCs for each of the six exposure pathways/receptor scenarios



identified for the Site. Use of the maximum detected concentration at the Site provides for a conservative evaluation against the RBCs. The results of this comparison are shown on Tables 9 and 10 for soil and groundwater, respectively.

The concentration of benzene detected in soil at one location (B-21 @ 5.0 feet bgs) exceeds one applicable pathway "Vapor Intrusion into Buildings" for an occupational receptor. However, there are no basements on site or plans to construct any such structures. Consequently, the actual risk from vapor intrusion into site buildings is likely less than assumed using this screening process. The remaining five exposure pathway/receptor scenarios do not present a risk. Groundwater constituent concentrations do not exceed RBCs for any of the identified applicable exposure pathways.

Conservatively assuming a radial extent of 12 feet and a vertical extent of 15 feet, the volume of soil that could contain benzene at levels above the Vapor-Intrusion-into-Buildings RBC is estimated to be approximately 125 cubic yards. The area of soil impacts that exceed risk-screening levels is limited to an area beneath the former location of the fuel dispenser, which is located approximately 15-20 feet from the southwestern property boundary.

RIVER SOURCE EVALUATION

As discussed in the previous section, petroleum-related constituents are present in small areas of soils and groundwater on the Site. This section addresses whether this information might indicate the potential for these constituents to enter the river in substantial concentrations. To address this question, a preliminary and conservative risk screening was conducted (Section 8.1). This risk screening does not account for sitespecific conditions or fate/transport processes of any kind (e.g., attenuation or dilution prior to contact with receptors). For the constituents that passed through this conservative screening, site-specific conditions and fate/transport processes were evaluated to determine the likelihood that these constituents might enter the river at concentrations of potential concern (Sections 8.2 –8.5).

8.1 Risk Screening

A risk screening was conducted that focused on potential pathways to the river and receptors that would be present in the river.

8.1.1 Pathways to River - Conceptual Model

The primary potential pathway for constituents in soils to reach the river would be via desorption/dissolution to groundwater and transport via groundwater to the river. It is also possible that constituents in soils could be eroded or washed by storm water and deposited in the river. However, three factors make this pathway unlikely. One, all detected constituents were in samples that are 3 feet or more below the ground surface and would not be exposed to storm water. Two, most of the Site is impervious surfaces, which prevents direct interaction of soils and storm water. Three, there are no industrial activities occurring on uncovered portions of the Site that are exposed to storm water or that would come into contact with rainwater flowing across or onto the mostly-paved Site.

Constituents in soils could also volatilize to the air. However, only a tiny fraction of any volatilized constituents would be expected to be transported to the river, and this cannot be considered a significant pathway.



Finally, groundwater could seep to the surface and flow into the river. However, there is no evidence of any groundwater seepage on the level portions of the Site. Groundwater seepage at the riverbank can be considered essentially the same pathway as groundwater transport directly to the river and is evaluated in that way below.

8.1.2 River Receptors

Both aquatic life and wildlife utilize the river to varying degrees and are potential receptors for any constituents that enter the river (after mixing, dilution, and oxidation with river water). People who incidentally or intentionally consume water and aquatic life from the river are also potential receptors.

8.1.3 Toxicity Assessment

The following ambient water quality criteria and guidelines (in the form of concentrations), which are protective of both aquatic ecosystems and human health, were used for the toxicity assessment::

- 1) USEPA (1999) National Recommended Water Quality Criteria for the protection of aquatic life and human health
- USEPA (2000) Drinking Water Standards (Maximum Contaminant Levels) for the protection of human health
- Oregon Water Quality Criteria (OAR 340-041, Table 20) for the protection of aquatic life2

In addition, literature reported aquatic life toxicity data were also used. These data were obtained from freshwater bioassay information available through USEPA (2001) ECOTOX Database.

² The State of Oregon adopted the 1986 version of the National Water Quality Criteria under OAR 340-041-445(2)(p)(B). Consequently, the 1999 National criteria are more recent and are used for all human health based comparisons. However, some aquatic life criteria that were present in the 1986 version of the National Water Quality Criteria were rescinded in the 1999 National criteria. Where no other criteria were available, 1986 aquatic life criteria (still applicable under Oregon law) were used in the risk screening.



8.1.4 Exposure Assessment

This risk screening utilizes an overly conservative approach to exposure that ignores fate and transport processes and thereby over-estimates any risks to public health and the aquatic environment. Groundwater samples were taken throughout the Site. Two locations (B-15 and B-17) were immediately adjacent to the shoreline (Figure 4). Constituent concentrations in these samples would be most indicative of any constituent concentrations available to enter the river via groundwater transport. All but a few constituents were undetected in groundwater samples from B-15. Since the groundwater sample from B-17 had higher constituent concentrations than any constituents detected in any of the other nearshore groundwater samples, concentrations of constituents from the groundwater sampled at B-17 were used in the risk screening.

Even though B-17 is located along the shoreline, it is still approximately 45 feet (horizontal distance) from the typical waterline in the Willamette River (Figure 4). Therefore, groundwater at 24 to 28 foot bgs (the sampled interval at B-17) still must travel through a considerable amount of soil before entering the river. Given the locations of residual soil impacts at the Site, groundwater constituent concentrations traveling from B-17 to the river would be expected to be further attenuated before entering the river. In addition, once groundwater leaves the soil zone and enters the river, constituent concentrations would be further diluted by the relatively large volume of water flowing in the river.

Although further attenuation and then dilution is likely to occur before any river receptors would contact any groundwater-transported constituents, the undiluted and unattenuated concentrations observed in the groundwater sample from B-17 were used in the risk screening. This is clearly an overly conservative approach, which will overestimate any risks that might actually occur in the river.



8.1.5 Risk Screening Results

The undiluted constituent concentrations observed in the groundwater sample from B-17 were compared to the surface freshwater toxicity values discussed in Section 8.1.3. This comparison is summarized in Table 11.

In some cases, no applicable water quality criteria or toxicity values were found for some constituents including MTBE, EDB, and EDC, which were all undetected in B-17 groundwater. Also, lead was sampled but was not detected in the B-17 groundwater sample. These undetected constituents were not examined further.

Table 11 presents the hazard quotient for each constituent, which is the observed concentration divided by the toxicity value. In this case, the lowest applicable toxicity value was used to calculate the hazard quotient. Hazard quotients greater than one indicate a potential risk (assuming the lowest toxicity value is the most applicable to this situation).

Remembering the conservative nature of this risk screening, the following nine constituents were above a criterion or toxicity value:

- Benzene
- Ethylbenzene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Indeno(1,2,3-cd)pyrene

All but one of these constituents exceeded a criterion based solely on the human health consumption of fish and/or water. Benzo(g,h,i)perylene exceeds an aquatic toxicity value only slightly (hazard quotient of 1.4).

8.2 Applicability of Screening Criteria to Site Specific Conditions

Because aquatic life criteria/toxicity values are not exceeded (with one very minor exception), the potential risks found in this analysis are driven entirely by comparison to USEPA human health water quality criteria. These criteria all assume consistently high levels of consumption of water and fish residing in the affected water body by people over an entire lifetime. While these criteria assumptions may be appropriate when applied to some surface waters and/or drinking water, they are likely inappropriate for this reach of the Willamette River.

8.2.1 Drinking Water Comparisons

For example, drinking water standards assume that a person would drink 2 liters per day from the affected water body for their entire life. This means someone would have to drink 2 liters of water taken from the river bottom near the Site daily for an entire lifetime (or about 730 liters/yr). Realistically, water consumption from the river will only be through incidental contact and ingestion during swimming or similar recreational activities. Standard EPA consumption rates for this type of scenario is about 50 ml per hour with about 18 hours exposure per year (or 0.9 liters per year) (USEPA 1997). Thus, drinking water MCLs are more than 800 times too conservative for this situation. The greatest exceedance for any constituent above the MCL is benzene, which was present at only 25 times the MCL in groundwater. Thus, it is extremely unlikely that any of these constituent concentrations (even undiluted and unattenuated) pose a risk to people via incidental ingestion of river water. Constituents exceeding the risk screening based on water consumption only are not evaluated further in this document.

8.2.2 Fish Consumption Comparisons

Seven of the constituents found in the risk screening process were screened in because they exceeded the USEPA criteria based on the consumption of fish and water (both items together) over a lifetime. For organic constituents with any potential to bioaccumulate in the aquatic food chain, these EPA human health criteria are determined almost entirely by the fish portion of the diet (rather than

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the water portion). That is, a relatively small portion of a person's daily dose of any bioaccumulative constituent comes from the water portion of their diet.

The default assumption for existing National water quality criteria is a fish consumption rate of 6.5 grams per day for a lifetime. Fish meal sizes can vary considerably, but the reported national average is about 126 grams per meal (USEPA 1997). Accordingly, the standard EPA approach assumes that someone would catch and eat approximately 19 meals of fish annually from the site in question. Consequently, the following series of assumptions are needed in order for the standard EPA criteria to be applicable to this situation:

- People must obtain 19 or more meals of fish from directly in front of the Site
- This rate of consumption of fish from in front of the Site must occur for an entire lifetime
- The fish caught and consumed must have spent their entire lives directly in front of the Site.

While it is possible that people may eat this number of fish meals annually from this industrial stretch of the Willamette River, it is extremely unlikely that as many as 19 meals per year would come from directly in front of the Site. It is even more unlikely that such a consumption rate would be maintained for a lifetime. Finally, the home ranges of almost all sport fish in the Willamette River are likely to be much larger than the area directly in front of the Site.

8.3 Fate and Transport Issues

The above discussion supports the conclusion that, even assuming no attenuation or dilution of groundwater concentrations, risks are extremely unlikely to river receptors. However, the likelihood of risks is even less when the attenuation processes are considered. This section discussed attenuation processes. The next section discusses dilution processes.

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As stated above, groundwater constituents measured in boring B-17 would have to travel through approximately 45 feet of soil before reaching the river. Major factors affecting attenuation of organic constituents in groundwater moving through soils are:

- Partitioning rate of the constituent to soil (primarily governed by the organic carbon partitioning coefficient or K₀c for the constituent)
- · Solubility of the constituent in water
- Degradation rates of constituents (related to oxidation conditions)
- The porosity of the soil and the rate of groundwater flow.

Approximate K_{oc} , solubility, and degradation values for the constituents passing through the risk screening process for the fish consumption pathway are shown in Table 12.

All of the PAHs (all constituents in Table 12 except benzene) have very high organic carbon partitioning coefficients and very low solubilities in water. This indicates that they will readily adsorb to soils and are not easily transported in groundwater. The attenuation of these constituents in soils, even over very small distances, would be substantial in nearly all circumstances.

Benzene has a high solubility and low organic carbon partitioning constant, indicating that it has the potential for groundwater transport. However, the soil partitioning of benzene is measurable and would be expected to reduce these constituent concentrations to some extent over the distances to the river. It is also important to note that benzene has a relatively high aerobic degradation half life (20 days; Table 12). However, aerobic conditions probably only occur within groundwater very close to the riverbank. The anaerobic half-life for benzene has been reported in the 720 days range (HSDB 2001).

The groundwater flow velocity for the Sand Unit water bearing zone at other nearby sites along the Willamette River has been reported (HAI 1998) in the 0.007 to 0.13 foot per day range. This would mean that groundwater at B-17 would take anywhere from 1 to 16 years to reach the riverbank.

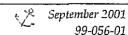


All of these fate and transport parameters indicate that the PAH concentrations would be severely reduced during transport to the riverbank where dilution processes would occur (discussed below). Benzene concentrations would likely also be reduced during transport to the river, mainly due to degradation, but probably not to the same degree as the PAHs.

8.4 Exposure at Point of Compliance

The above discussion considers the changes in groundwater concentrations due to attenuation processes that are likely from B-17 to the riverbank. This section considers the final step in the exposure pathway, which is the concentration of any constituents in the river at the point of compliance for river receptors. Just as an outfall to a river is diluted by the flow in the river, any constituents from groundwater that exit the riverbank will be diluted to some extent in the river. All detailed risk assessments of discharges to river systems evaluate the important effects of dilution. If any constituents present are diluted to below applicable toxicity values within a reasonably small zone, then the actual risks to river receptors can be considered negligible. The acceptable size of such a zone may be determined by the habits and exposure patterns of receptors in question (e.g., fish or recreational fishers) or mixing zone regulations/policies for the applicable jurisdiction.

A general estimate of the expected dilution can be obtained by comparing the groundwater flow rates from the Site to those in the river. Groundwater flows can be estimated by determining the cross sectional area over which the contaminated groundwater might be discharged into the river and multiplying by the groundwater flow velocity discussed above (0.007 to 0.13 foot/day). The linear shoreline extent of groundwater impacts is not completely characterized by the one sample at B-17. However, for purposes of this evaluation, it can be conservatively estimated that groundwater impacts extend 45 feet on either side of the B-17 sample (or about 90 feet)³. The vertical extent of groundwater impacts can be very conservatively estimated to be about 10 feet due to the likely low permeability of the



³ Boring B-16 is 45 feet distant from B-17 toward the north and did not contain sufficient groundwater for sampling. Therefore, the overall assumption of 90 linear feet of potentially contaminated groundwater discharge appears conservative.

silt layer below the sand layer. This results in a 900 square foot cross section of river bank, which multiplied by maximum groundwater velocity of 0.13 foot/day yields a maximum groundwater flow rate of about 0.001 cubic feet per second (cfs). Extreme low flow condition for the Willamette River at the USGS Portland gauge station is about 6,000 cfs (USGS 2001).

Of course, the actual dilution characteristics of the river would be dependent on the tidal and river current conditions immediately adjacent to the Site. However, regardless of the specific dilution patterns at any one moment, it is clear that the discharge from groundwater would be extremely small in comparison to the volumes of water available for dilution at any one time, and that substantial dilution would be provided over very short distances in nearly all circumstances.

8.5 Source Evaluation Conclusions

As discussed above, the risk screening is very conservative, yielding results that overestimate any risks that may actually occur in the river. A realistic consideration of the other site-specific, fate/transport, and dilution factors relevant to this Site supports the conclusion that risks to river receptors from any of the constituent concentrations found in the groundwater are exceedingly unlikely.

Even if one compares the highest hazard quotient for any constituent (i.e., benzene with a hazard quotient of 104 for fish consumption) to the estimated level of conservatism associated with each assumption, the risks for benzene are very approximately overestimated as follows:

- Fish consumption rate 10 times overestimated (i.e., 2 rather than 18 fish meals annually from in front of the Site)
- Fish bioconcentration 2 times (i.e., conservatively estimate recreational fish spend 50 percent of their time rather than 100 percent in front of the Site)
- Degradation/attenuation 5 times (i.e., limited but measurable attenuation and degradation during transport to river)



• Dilution effect on bioconcentration – 50 times (i.e., fish would actually be exposed on a continual basis to highly diluted concentrations of constituents in the river)⁴.

Factoring all these overestimated assumptions together, the hazard quotient for benzene should be divided by about 5,000 (at a minimum), yielding a hazard quotient of about 0.02. That is, the risk from benzene in groundwater to river receptors (specifically human health consumption of fish) is about 2 percent of the level of potential concern. The risk from other constituents, such as PAHs, are expected to be much lower due to their lower hazard quotients and more favorable fate/transport characteristics.

Risks for other receptors in the river would be even lower given the hazard quotients for any constituents do not exceed values of:

- 25 for benzene for human water consumption
- 1.4 for benzo(g,h,i)perylene for aquatic life.

⁴ It could be argued that there is considerable room for upward revision of these estimates. In particular, the dilution estimate (dilution factor of 50) is still extremely conservative given the 6 orders-of-magnitude difference between groundwater and river flows. In addition, if the upper bound estimates of groundwater velocities are correct (e.g., about 16 years for groundwater to reach the shoreline), then anaerobic degradation of benzene during transport to the river would reduce benzene concentrations by a factor of about 250 rather than the factor of 5 shown above.



CONCLUSIONS

9.1 Upland Soils and Groundwater

Following DEQ guidance (ODEQ 1999), there are no upland risks from residual petroleum related impacts to soils and groundwater. Based on these findings no further characterization or remediation of soils and groundwater is necessary.

9.2 River Source Evaluation

The primary goal of this sampling effort was to determine whether upland areas of the Site might be a source of constituents to the river at concentrations of potential concern. Careful evaluation of the sampling results indicates that risks to river receptors from the observed constituent concentrations in groundwater and soil are negligible. Therefore, the Site is not a source of constituents to the river.

This conclusion is further supported by the fact that the river sediments contains ratios of LPAHs to HPAHs that are indicative of general urban storm water inputs, which are generally dominated by pyrogenic sources of PAHs. The petrogenic materials used on the Site (i.e., oils, diesel, and gasoline) cannot be the source of the PAH mixtures observed in river sediments.

Given this evidence, no further remediation or investigation of groundwater or soils for the purposes of determining potential sources to the river is warranted. For similar reasons, the Preliminary Assessment, particularly for the purposes of source identification and as documented by the Expanded Preliminary Assessment Summary Report, the Supplemental Preliminary Assessment Report, and this report and their respective appendices, can be considered complete and no further submittals of information are necessary to satisfy Brix Maritime's agreement to perform a preliminary assessment.



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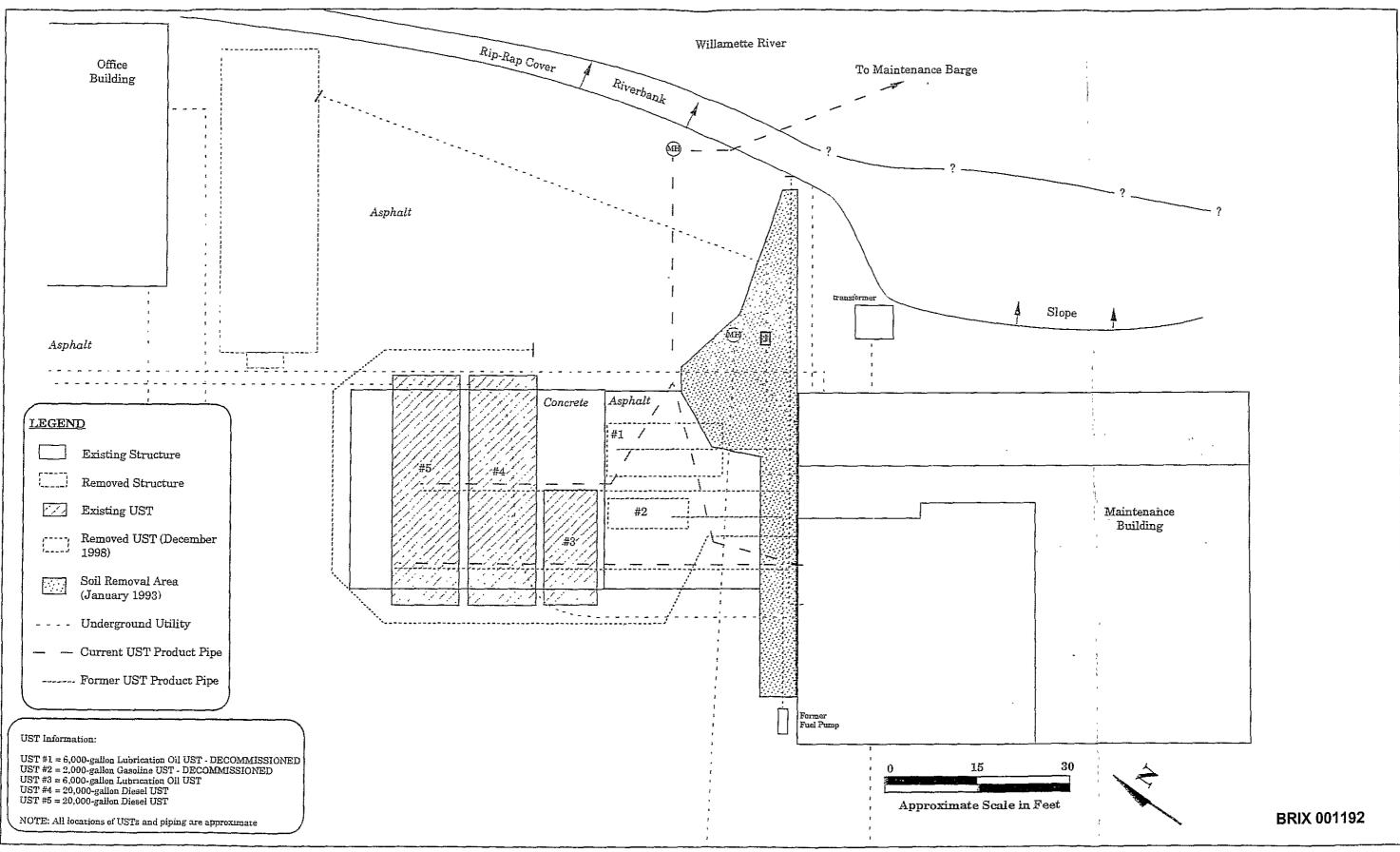
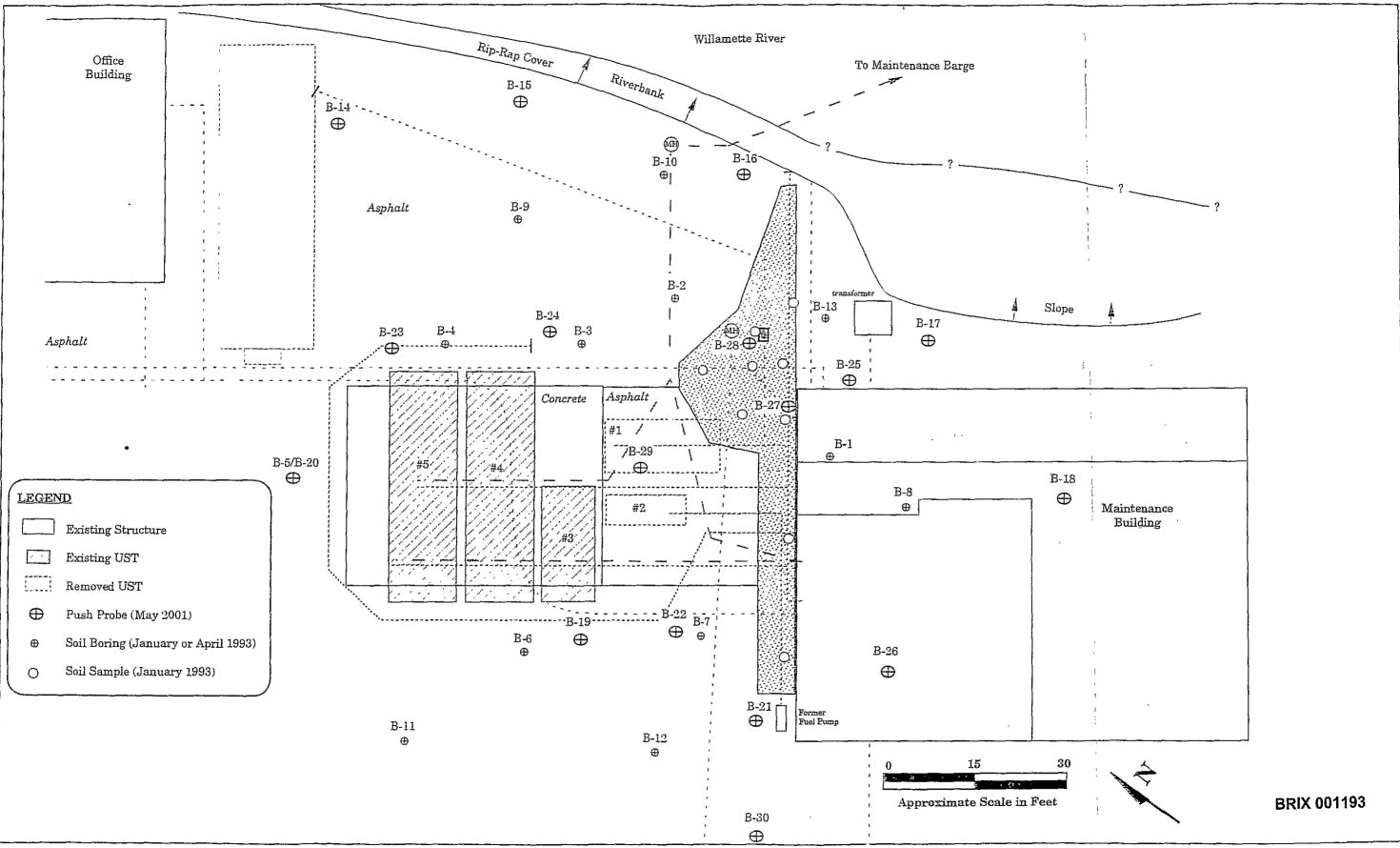




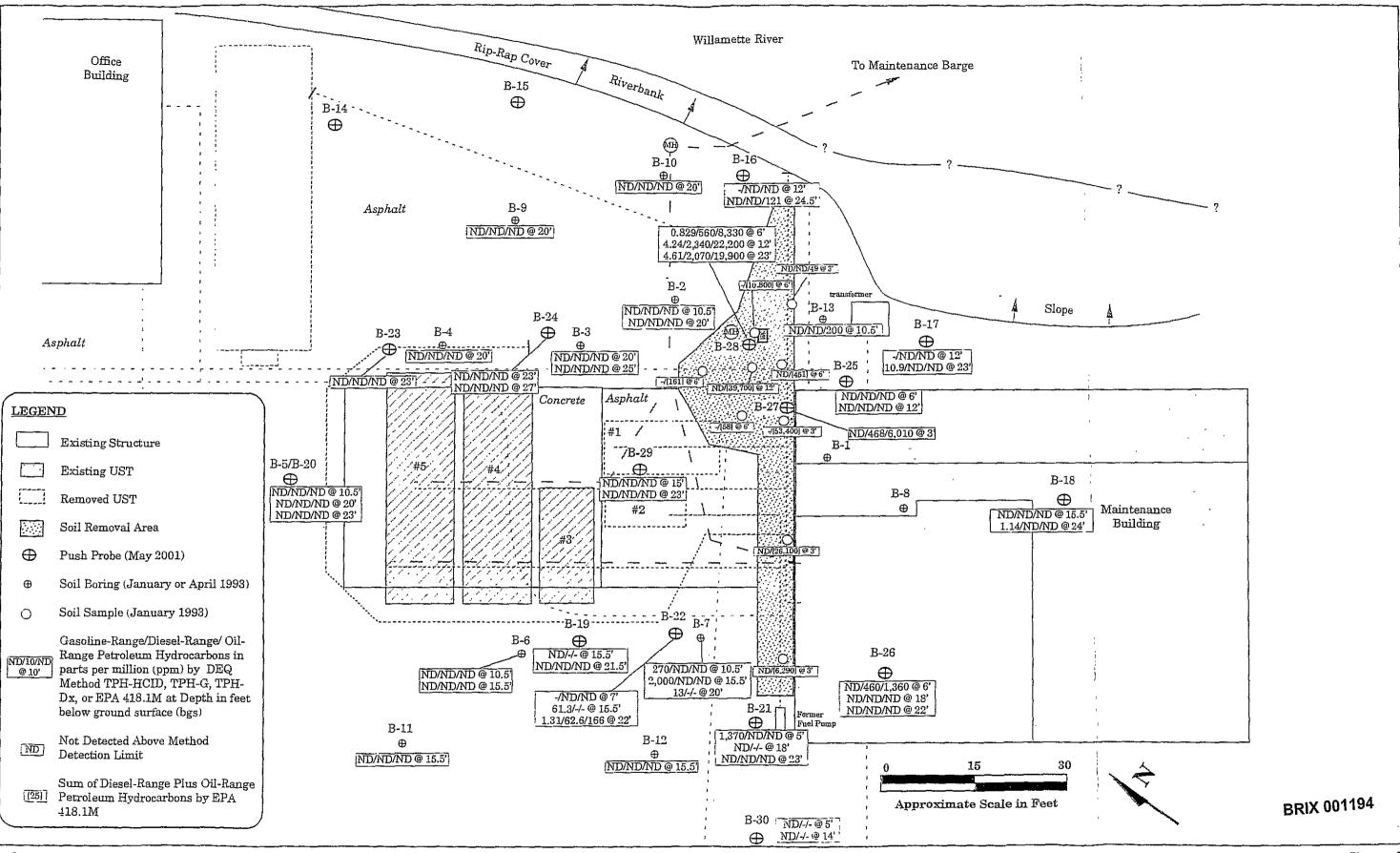
Figure 3
Underground Storage Tank Area Map



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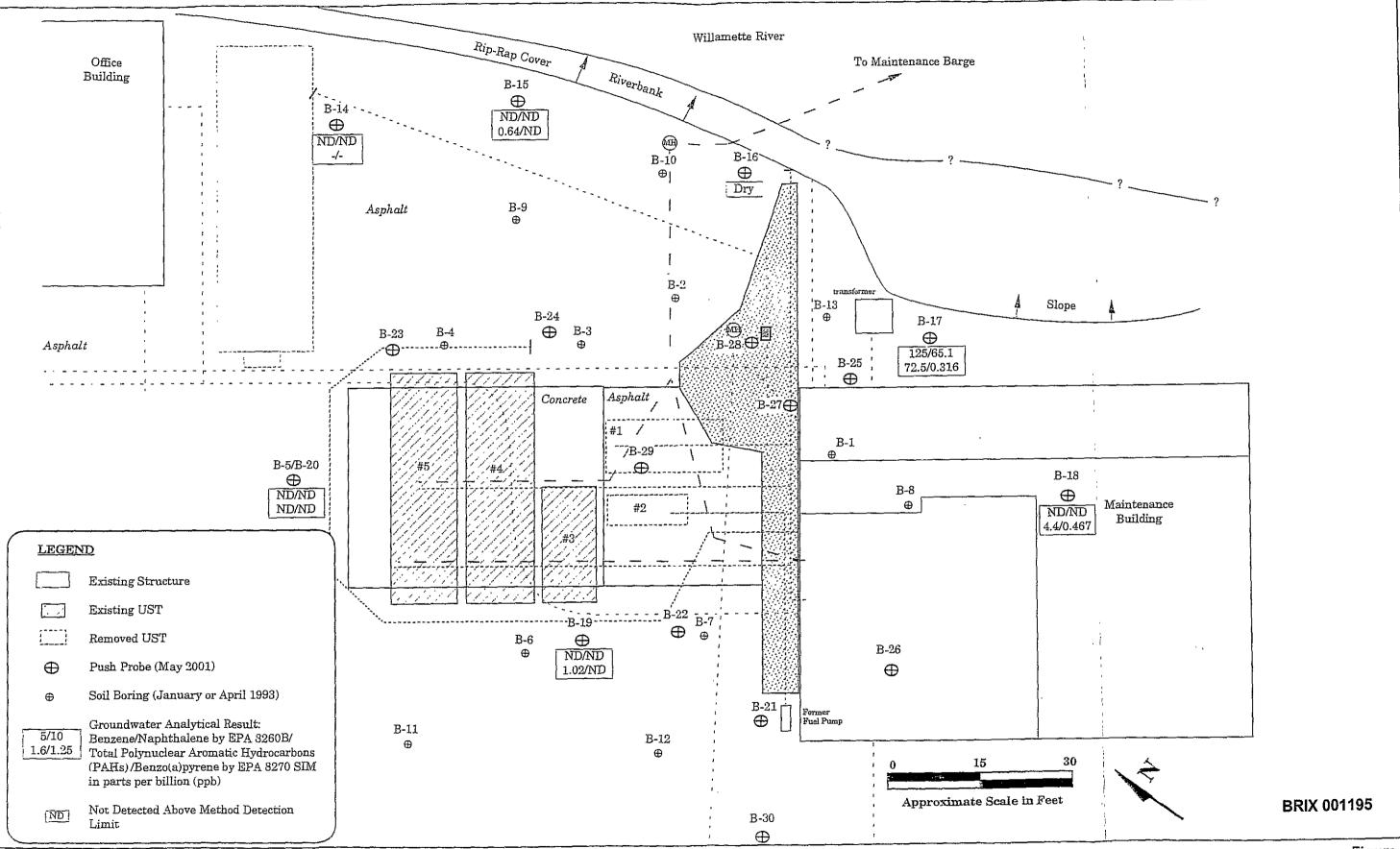
Figure 4
Sample Location Map



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Figure 5
Petroleum Hydrocarbons in Soil





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Figure 6
Petroleum Constituents in Groundwater

TABLES

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| | | | | | Ground | | | |
|------------------|---------------------------------|-----------|---------------------------|------------|------------------------------------|-------|-------------------------|--|
| Boring Number | | | Total Depth (feet bgs) | Install | Depth Encountered (feet bgs) | | Sample No. ¹ | |
| B-14 | River bank area | 29-May-01 | 32.0 | Push Probe | 32.0 | 28-32 | 29-108 | |
| B-15 | River bank area | 29-May-01 | 28.0 | Push Probe | 26.5 | 24-28 | 29-104 29-105 | |
| B-16 | River bank area | 29-May-01 | 28.0 | Push Probe | - | 24-28 | Dry | |
| B-17 | River bank area | 29-May-01 | 28.0 | Push Probe | 28.0 | 24-28 | 29-109 | |
| B-18 | Beneath Maintenance Building | 29-May-01 | 28.0 | Push Probe | 26.5 | 24-28 | 29-107 | |
| B-19 | West of UST area | 24-May-01 | 28.0 | Push Probe | 23.0 | 24-28 | 24-102 | |

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| | | | | | Ground | mmary. | |
|------------------|--------------------------|-----------------|---------------------------|-------------------|------------------------------------|----------------------------------|--------------|
| Boring Number | Eocation | Install Date | Total Depth (feet bgs) | Install Method | Depth Encountered (feet bgs) | Screen luterval (feet bgs) | Sample No. 1 |
| | | | | | | | |
| B-20 | North of UST area | 24-May-01 | 28.0 | Push Probe | 27.0 | 24-28 | 24-103 |
| | | | | | | | , |
| B-21 | Next to former fuel pump | 24-May-01 | 24.0 | Push Probe | 7 | - | - |
| B-22 | West of UST and | 24-May-01 | 28.0 | Push Probe | - | - | |
| | areas | | | | | | - |
| | | | | | | | |
| B-23 | Northwest of UST area | 24-May-01 | 28.0 | Push Probe | | | |
| B-24 | East of UST area | 25-May-01 | 28.0 | Push Probe | - | 1 ng | - |
| | | | | | | | |

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| | | | | | erouna) | vater Dafa Su | mmary |
|---------------------|-------------------------------|-----------------|---------------------------|----------------|--|--|---------------|
| 1 W. C. C. C. T. T. | | | | | Depth - | Screen | |
| Boring Number | Location = | install Date | Total Depth (feet bgs) | | Encountered (feet bgs) | Interval (feet bgs) | Sample No. 1 |
| | | | | | THE PROPERTY OF THE PARTY OF TH | William Adders | 3-Windibirity |
| B-25 | South of soil removal area | 25-May-01 | 24.0 | Push Probe | <u>-</u> | - | - |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| B-26 | South of soil removal | 25-May-01 | 24.0 | Roto-Hammer | - | _ | - |
| D-20 | area | 20-May-01 | 24.0 | Kolo-Hallillel | - | - | _ |
| | | | | | | | |
| | | | | | | | |
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| | | <u> </u> | ; | | | | - |
| | | | | | | | |
| | | | | <u> </u> | | | |
| | | | | | | | |
| B-27 | In soil removal area | 25-May-01 | 4.0 | ost Hole Digge | - | | - |
| B-28 | In soil removal area | 25-May-01 | 28.0 | Push Probe | - | - | - |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| B-29 | Decommissioned UST | 25-May-01 | 28.0 | Push Probe | - | <u> </u> | <u> </u> |
| | area | | | | | · | |
| | | 1 | | | | | |
| | | | | | | | |
| | | | | | | | |
| B-30 | West of former fuel pump | 24-May-01 | 24.0 | Push Probe | <u>.</u> | - | - |
| | | · | | <u> </u> | <u> </u> | |] _ |
| | | | | | | <u> </u> | BRIX 00119 |
| | | _ | <u> </u> | | | | ı |

Note: bg

bgs = below ground surface ppm = parts per million 1 = Sample No. prefix is 5074-0105

2 = 0.5 feet of asphalt or concrete was present at the surface of each push probe

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| | | | | Strata | | | | | |
| | Bottom Sample | | (feet | bgs) | Soil Type ² | | Field Scr | eening Re | sult s |
| Boring. | Depth (feet | | | | | | | Sheen | Headspace |
| Number | bgs) | Sample No. | Top | Bottom | | Odor | Visual | Test | (ppm) |
| B-14 | | | 0.5 | 1.0 | Gravel (GP) | - | <u> </u> | - | - |
| | 4.0 | 29-084 | 1.0 | 4.0 | Sand with trace Silt (SP) | по | по | no | 36.5 |
| | 8.0 | 29-085 | 4.0 | | Sand (SP) | no | no | no | 11.2 |
| | 12.0 | 29-086 | , | | | по | no | no | 24.9 |
| | 16.0 | 29-087 | | | | по | no | no | 19.2 |
| | 20.0 | 29-088 | | | | no | no | no | 6.1 |
| | 23.0 | 29-089 | | 23.0 | | no | no | no | 12.0 |
| | 28.0 | 29-090 | 23.0 | 32.0 | Silty Clay (CL) | no | no | no | 3.2 |
| B-15 | ! | | 0.5 | 2.0 | Gravel with some Sand (GP) | - | - | i - | - " |
| | 4.0 | 29-091 | 2.0 | 6.0 | Sand with Silt (SM) | no | no | по | 0.8 |
| | 8.0 | 29-092 | 6.0 | | Sand (SP) | · no | no | по | 1.5 |
| | 12.0 | 29-093 | | | | no | no | no | 2.0 |
| | 16.0 | 29-094 | | , | | no | no | no | 2.1 |
| | 20.0 | 29-095 | | | | no | no | no | 1.6 |
| | 24.0 | 29-096 | | 25.0 | | no | no | по | 1.4 |
| | 25.0 | 29-097 | 25.0 | <u> </u> | Silty Clay (CL) | no | no | no | 2.4 |
| | 28.0 | 29-098 | | 28.0 | | no | no | no | 0.6 |
| B-16 | | | 0.5 | <u> </u> | Gravely Sand with some Silt | ļ - | - | | - |
| | 4.0 | 29-099 | | 6.5 | | по | no | no | 3.2 |
| <u> </u> | 8.0 | 29-201 | 6.5 | | Sand (SP) | no | no | no | 4.2 |
| | 12.0 | 29-202 | | | | no | no | no | 6.0 |
| | 16.0 | 29-203 | | | | no | no | no | 7.7 |
| <u></u> | 20.0 | 29-204 | | | 1 | no | no | no | |
| | 23.5 | 29-205 | | | · | no | no | no | 13.2 |
| | 24.5 | 29-206 | | 24.5 | | no | no | no | 13.3 |
| | 27.0 | 29-207 | 24.5 | 28.0 | Silty Clay (CL) | no | l no | no | 9.6 |
| B-17 | | | 0.5 | | Gravely Sand with some Silt | - | - | - | |
| | 4.0 | 29-215 | | 4.5 | | yes | no | no | 6.9 |
| | 8.0 | 29-216 | 4.5 | | Sand (SP) | yes | no | по | 6.5 |
| | 12.0 | 29-217 | | | | yes | no | no | 10.6 |
| ļ | 16.0 | 29-218 | | | | yes | no | no | 9.2 |
| ļ | 20.0 | 29-219 | | 00.0 | | yes | no | no | 13.4 |
| | 23.0 | 29-220 | 00.0 | 23.0 | City Clay (CL) | yes | no | no | 123. |
| D 40 | 27.0 | 29-221 | 23.0 | 28.0 | Silty Clay (CL) | no | no | no | 8.8 |
| B-18 | 4.5 | 20.000 | 0.5 | 1.0 | Gravel (GP) | <u> </u> | - | - | - |
| | 4.0 | 29-208 | 1.0 | | Sand (SP) | no | no | no | 1.2 |
| | 8.0 | 29-209 29-210 | | | | yes | no | yes | 3.0 |
| | 12.0 | | <u> </u> | | | yes | no | no | 3.5 |
| | 16.0 | 29-211 | ! | 1 | | yes | no | no | j 5.5 |
| | 20.0 | 29-212 | | 24.0 | | yes | no | no | 8.5 |
| <u> </u> | 24.0 | 29-213 | 24.0 | 24.0 | City Clay (CL) | yes | l no | no | 4.8 |
| B 40 | 28.0 | 29-214 | 24.0 | 28.0 | Silty Clay (CL) | l no | no | no | 3.1 |
| B-19 | 1 40 | 24-021 | 0.5 | = 0 | Sand (SP) | - | - | - | - 22 |
| | 7.0 | 24-021 | 5.0 | 7.0 | Silty Sand (SM) | no | no | no | 3.3 |
| l | 1 1.0 | 1 44-022 | U,U | 1 7.0 | (Sitty Satitit (Sivi) | , no | no | no | 5.0 |

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| | trigers, collegen | | | Strata | Presence - Constant Pre- | 400-2004 | | en Erece | envigera (Berge |
| AND A COL | | | | | Soil Type ² | | i de ca | 0.0 | en en |
| | Bottom Sample | 在1000 (100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to | A COLUMN | ings)- 3 | Southype | in yanggan 1816 balan | rjeju aci | WAST AT LAND SAFE | Extractory of Contract View |
| Boring | Depth (feet | | | in vii | | Hipping y | /生活性 | Sheen | Headspace |
| Mumber | | Sample No. | | Bottom | | | | | (ppm) |
| | 10.0 | 24-023 | 7.0 | <u> </u> | Sand (SP) | yes | no | no | 16.1 |
| | 14.0 | 24-024 | ļ | | | yes | no | no | 28.1 |
| | 15.5 | 24-025 | | | | yes | no | no | 23.8 |
| | 19.0 | 24-026 | | 04.5 | | yes | no | no | 27.1 |
| | 21.5 | 24-027 | 04.5 | 21.5 25.5 | Silts Class (CL) | no | no | no | 29.5 |
| | 20.0 | 24-028 | 21.5 25.5 | | Silty Clay (CL) | - | | - | 40.0 |
| P 00 | 26.0 | 24-020 | 0.5 | 28.0 | Sand (SP) Gravely Sand with some Silt | ' no | no | no | 18.2 |
| B-20 | 3.0 | 24-029 | 1.5 | 1.0 | Sand (SP) | | no - | - | 3.1 |
| | 7.0 | 24-029 | 1,0 | | Salid (SF) | no | no | no | 2.7 |
| - | 11.0 | 24-030 | | | | ΠO | no | no | 3.6 |
| | 15.0 | 24-031 | - | | | no no | no | no | 5.4 |
| | 19.0 | 24-032 | | 20.5 | | no | no | no | 6.0 |
| | 23.0 | 24-034 | 20.5 | 24.5 | Clayey Sand (SC) | no | no | no | 4.2 |
| | 27.0 | 24-035 | 24.5 | 28.0 | Silty Clay (CL) | no | no | no | 1.1 |
| B-21 | 3.0 | 24-001 | 0.5 | 20.0 | Sand (SP) | yes | yes | yes | 718. |
| | 5.0 | 24-002 | 0.0 | | Joana (Or) | yes | yes | yes | 1,572. |
| | 10.0 | 24-003 | | | | yes | yes | yes | 42.6 |
| | 14.0 | 24-004 | | | | yes | yes | yes | 18.5 |
| | 18.0 | 24-005 | : | 21.0 | | yes | yes | yes | 13.7 |
| | 23.0 | 24-006 | 21.0 | | Silfy Clay (CL) | no | no | no | 6.9 |
| | 23.0 | 24-006 | | 24.0 | | по | no | no | 6.9 |
| B-22 | | <u> </u> | 0.5 | 2.0 | Silty Sand with trace Gravel (SM) | - | | - | - |
| | 4.0 | 24-013 | 2.0 | | Sand (SP) | no | no | no | 2.0 |
| | 7.0 | 04-014 | | | | V00 | Vec | V/00 | 22.8 |
| | 10.0 | 24-015 | | | | yes | yes yes | yes | 8.2 |
| | 15.5 | 24-015 | | | | yes yes | yes | yes yes | 53.3 |
| <u> </u> | 19.0 | 24-017 | } | 21.0 | | yes | yes | yes | 67.0 |
| | 22.0 | 24-018 | 21.0 | 22.5 | Silty Sand with trace Clay and Organics (SM) | no | no | no | 7.3 |
| - | 25.0 | 24-019 | 22.5 | 25.5 | Silty Clay (CL) | no | no | no | 3.7 |
| | 27.0 | 24-020 | 25.5 | 28.0 | Sand (SP) | no | no | no | 2.5 |
| B-23 | 3.0 | 24-036 | 0.5 | <u></u> | Sand (SP) | no | по | . no | 1.3 |
| | 7.0 | 24-037 | | | | no | no | no | 1.9 |
| | 11.0 | 24-038 | | | | no | no | no | 1.0 |
| | 15.0 | 24-039 | [| 1 | | no | no | no | 0.2 |
| | 19.0 | 24-040 | | | | no | no | no | 1.6 |
| | 23.0 | 24-041 | ļ | 23.0 | | no | no | no | 1.6 |
| | 27.0 | 24-042 | 23.0 | 28.0 | Silty Clay (CL) | no | по | no | 0.3 |
| B-24 | | | 0.5 | ; 2.0 | Gravely Sand with some Silt | - | - | - | |
| | 3.0 | 25-043 | 2.0 | 1 | Sand (SP) | ло | no | no | 23.8 |
| | 7.0 | 25-044 | 1 | | | по | no | no | 47.1 |
| | 11.0 | 25-045 | | | | no | по | no | 42.9 |
| | 15.0 | 25-046 | 1 | | | no | по | no | 41.8 |
| | 19.0 | 25-047 | 1 | <u> </u> | | no | no | no | 19.3 |
| | 23.5 | 25-048 | 1 | 23.5 | | no | по | no | 26.1 |

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| STATE STATE | | Section of the second section where | 4-idlátetá | | | odski ili uni | 15.785 \$. 4361 | SELVER 1890 | e en Caustania |
|-------------|----------------------|-------------------------------------|------------|----------------|----------------------------------|---------------|------------------------|-------------|--|
| | | | | | Soil Dáta Sumn | іагу | | | |
| | | | | | | | | | |
| | | National States | | Strata | | | new Killier | | a de la sala de la composición dela composición de la composición de la composición dela composición dela composición dela composición dela composición de la composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición dela composición |
| | Bottom Sample | | (feet | bgs) | Soil Type | | Field Scr | | sults |
| Boring | Depth (feet | ers backer | | | | | area res | Sheen | Headspace |
| Number | | | | | | Odor | Visual | Test | (ppm) |
| | 27.0 | 25-049 | 23.5 | | Silty Clay (CL) | no | no | no | 15.8 |
| B-25 | 4.0 | 25-077 | 0.5 | 4.0 | Sand (SP) | no | no | по | 0.4 |
| | | | | L | | | | | |
| | 6.0 | 25-078 | 4.0 | 7.0 | Silty Sand (SM) | no | no | no | 0.6 |
| | 10.0 | 25-079 | 7.0 | | Sand (SP) | no | no | yes | 0.9 |
| | 12.0 | 25-080 | | | | по | no | yes | 1.1 |
| - | 16.0 20.0 | 25-081 25-082 | | | | no | no | по | 0.0 |
| | 23.0 | 25-082 | | 23.0 | | no | no | no | 0.7 |
| | | | 23.0 | 1 | Silby Clay (CL) | yes | no | no | , 154. |
| B-26 | - | - | 0.5 | | Silty Clay (CL) Gravel (GP) | yes | no - | no | <u></u> |
| D-20 | | | υ,5 | '.0 | Glaver (GF) | - | | - | _ |
| | 2.0 | 25-051 | 1.0 | | Sand (SP) | no | no | no | 0.6 |
| | 4.0 | 25-052 | 1.0 | | | no | no | no | 1.3 |
| | 6.0 | 25-053 | | | | no | no | no | 2.1 |
| <u> </u> | 8.0 | 25-054 | | - | | no | no | no | 3.9 |
| | 10.0 | 25-055 | | l | | no | no | no | 3.2 |
| | 12.0 | 25-056 | | | | no | no | no | 3.0 |
| | 14.0 | 25-057 | | i | - | no | по | no | 4.2 |
| | 16.0 | 25-058 | | | | no | no | no | 4.6 |
| | 18.0 | 25-059 | | | | yes | no | no | 13.4 |
| | 20.0 | 25-060 | | 20.5 | | yes | по | no | 8.5 |
| | 22.0 | 25-061 | 20.5 | 23.5 | Silty Clay (CL) | no | no | no | 0.0 |
| | 24.0 | 25-062 | 23.5 | 24.0 | Sand (SP) | no | по | no | 0.1 |
| B-27 | | | 0.5 | 1.5 | Gravel (GP) | - | - | - | - |
| | 3.0 | 25-050 | 1.5 | 4.0 | Sand (SP) | no | no | no | 6.1 |
| B-28 | · 4.0 | 25-069 | 0.5 | | Sand (SP) | ло | no | no | 25.3 |
| | 6.0 | 25-070 | | | | yes | yes | yes | 28.1 |
| | 9.0 | 25-071 | | | | yes | yes | yes | 58.8 |
| | 12.0 | 25-072 | | <u> </u> | | yes | yes | yes | 76.5 |
| | 16.0 | 25-073 | | | | yes | yes | yes | 79.2 |
| | 20.0 | 25-074 25-075 | 1 | 22.0 | | yes | yes | yes | 31.2 |
| | 23.0 27.5 | 25-075 25-076 | 23.0 | 23.0 28.0 | Silly Clay (CL) | yes | yes | yes | 43.2 |
| B-29 | 7.0 | 25-076 | 0.5 | 20.0 | Silty Clay (CL) Sand (SP) | no no | no no | no | 7.1 |
| D-28 | , 1.0 | 20-000 | 0,0 | } | oana (or) | IIO | 110 | no | 0.0 |
| ļ | 12.0 | 25-064 | <u> </u> | | | no | no | no | 4.7 |
| | 15.0 | 25-065 | | | | yes | no | no | 3.3 |
| | 19.0 | 25-066 | | | | yes | no | no | 5.8 |
| | 23.0 | 25-067 | | 23.0 | | yes | no | no | 2.9 |
| | 27.0 | 25-068 | 23.0 | | Silty Clay (CL) | no | no | no | 1.1 |
| B-30 | 2.0 | 24-007 | 0.5 | | Silty Sand with some Gravel (SM) | | no | no | 3.9 |
| | 5.0 | 24-008 | <u> </u> | 5.5 | | yes | no | no | 7.4 |
| | 10.0 | 24-009 | 5.5 | | Sand (SP) | yes | . no | no | 4.6 |
| | 14.0 | 24-010 | i | | , , | yes | no | no | 4.7 |
| | 19.0 | 24-011 | | 19.0 | | yes | no | no | 4.3 |
| | 23.0 | 24-012 | 19.0 | | Silty Clay (CL) | no | no | no | 1.1 |

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Sampling Results Report Brix Maritime Site

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Table 2 Summary of Analytical Results for Soil Samples - January 1993 Test Pit Investigation

| | | | in the state of th | as de la Ar | lts in mg/kg (j ≣Q Methods | THE PARK MAY COMPANIES OF THE PARK | |
|------------------|-----------------|-------------------------------------|--|-------------|-------------------------------|------------------------------------|---------------------------|
| Sample Number | Date Sampled | Sample Location | Depth | Gasoline | TPH-HCID Diesel | Qil | TPH-418.1:M Diesel/Oil |
| 2279-01 | 26-Jan-93 | Test Pit (east wall) | 6.0 | ND>20 | Detected | Detected | 451 |
| 2279-02 | 26-Jan-93 | Test Pit (floor) | 12.0 | ND>20 | Detected | Detected | 39,700 |
| 2279-03 | 27-Jan-93 | Test Pit (north wall) | 6.0 | - | - | - | 10,800 |
| 2279-04 | 27-Jan-93 | Test Pit (west wall) | 6.0 | - | - | - | 161 |
| 2279-05 | 27-Jan-93 | Test Pit (south wall) | 6.0 | ND>20 | Detected | Detected | 58 |
| 2279-06 | 27-Jan-93 | Trench (at dispenser) | 3.0 | ND>20 | Detected | Detected | 6,290 |
| 2279-07 | 27-Jan-93 | Trench (20 feet north of dispenser) | 3.0 | ND>20 | Detected | Detected | 26,100 |
| 2279-08 | 27-Jan-93 | Trench (40 feet north of dispenser) | 3.0 | ND>20 | ND>50 | Detected | 53,400 |
| 2279-09 | 27-Jan-93 | Trench (60 feet north of dispenser) | 3.0 | ND>20 | ND>50 | Detected | 49 |

NOTE:

- - not analyzed

DEQ - Oregon Department of Environmental Quality

mg/kg - milligrams per kilogram

ND - not detected above detection limit indicated

ppm - parts per million

TPH - total petroleum hydrocarbons

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Sampling Results Report Brix Maritime Site

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Table 3
Summary of Analytical Results for Soil Samples - January 1993 Subsurface Investigation

| | | | | | 40 F J. C C C C C C C C C C C C C C C C C C | 54-1-500 10 . Late 100 | in mg/kg (p | pm) |
|-------------|---------|-----------|--------|----------|---|--------------------------|-------------|------------|
| Soil Boring | Sample | Date | Depth | | TPH-HCIU | Search Committee Company | TPH-G | TPH-418.1° |
| Number | Number* | Sampled | (feet) | Gasoline | Diesel | OIL | Gasoline | M OIL |
| B-2 | 15-003 | 15-Apr-93 | 10.5 | ND>20 | ND>50 | ND>100 | | - ! |
| B-2 | 15-005 | 15-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-2 | 15-006 | 15-Apr-93 | 25.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-3 | 15-010 | 15-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-3 | 15-011 | 15-Apr-93 | 25.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-4 | 15-015 | 15-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-5 | 15-018 | 15-Арг-93 | 10.5 | ND>20 | ND>50 | ND>100 | - | |
| B-5 | 15-020 | 15-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-6 | 15-022 | 15-Apr-93 | 10.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-6 | 15-023 | 15-Apr-93 | 15.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-7 | 15-027 | 15-Apr-93 | 10.5 | Detected | ND>50 | ND>100 | 270 | - |
| B-7 | 15-028 | 15-Apr-93 | 15.5 | Detected | ND>50 | ND>100 | 2,000 | _ |
| B-7 | 15-029 | 15-Apr-93 | 20.5 | - | | - | 13 | + |
| B-9 | 16-004 | 16-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-10 | 16-008 | 16-Apr-93 | 20.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-11 | 16-011 | 16-Apr-93 | 15.5 | ND>20 | ND>50_ | ND>100 | - | - |
| B-12 | 16-016 | 16-Apr-93 | 15.5 | ND>20 | ND>50 | ND>100 | - | - |
| B-13 | 16-020 | 16-Apr-93 | 10.5 | ND>20 | ND>50 | Detected | | 200 |

NOTE:

- - not analyzed

DEQ - Oregon Department of Environmental Quality

mg/kg - milligrams per kilogram

ND - not detected above detection limit indicated

ppm - parts per million

TPH - total petroleum hydrocarbons
* - sample number prefix 2289-9304

Sampling Results Report Brix Maritime Site

Table 4
Summary of Analytical Results for Soil Samples - May 2001 Subsurface Investigations

| | | | | 清明本(新聞) | | Analytic | ćal Results⊱i | ng/kg (ppm) | | | |
|-----------------------|------------------|-------------|---------------------|--------------------------|----------|-------------------|-------------------|-------------|----------|----------|---------------|
| | | | Sample S | | NW Meth | ods - | | EPA 8021 | EPA 8260 | EPA 8270 | EPA 6010 |
| Soil Boring Number | Sample Number | Sample Date | Depth (feet bgs) | HCID Gas, Diesel, Oil | | | PH-DX (FIXE) | Total BTEX | VOCs | PAHs | Total Lead |
| B-16 | 29-202 | 29-May-01 | 12. | - | - | ND>21.7 | ND>54.3 | - | - | - | - |
| | 29-206 | 29-May-01 | 24.5 | - | ND>0.704 | ND>28.2 | 121. | _ | _ | | |
| B-17 | 29-217 | 29-May-01 | 12. | - | - | ND>21.5 | ND>53.8 | - | - | - | _ |
| | 29-220 | 29-May-01 | 23. | - | 10.9 | ND>22.0 | ND>54.9 | | - | - | - |
| B-18 | 29-211 | 29-May-01 | 15.5 | - | ND>0.532 | ND>21.3 | ND>53.2 | - | - | _ | - |
| | 29-213 | 29-May-01 | 24. | - | 1.14 | ND>24.7 | ND>61.7 | - | - | | - |
| B-19 | 24-025 | 24-May-01 | 15.5 | - | ND>0.500 | - | - | | | - | - |
| | 24-027 | 24-May-01 | 21.5 | _ | ND>0.617 | ND>24.7 | ND>61.7 | ND | - | - | ~ |
| B-20 | 24-034 | 24-May-01 | 23. | - | ND>0.641 | ND>26.0 | ND>64.9 | - | - | - | - |
| B-21 | 24-002 | 24-May-01 | 5. | Gasoline | 1,370. | ND>24.7 | ND>61.7 | - | 255.7 | - | 4.4 |
| | 24-005 | 24-May-01 | 18. | - | ND>0.543 | | - | ND | - | _ | - |
| | 24-006 | 24-May-01 | 23. | - | ND>0.667 | ND>26.7 | ND>66.7 | | - | - | - |
| B-22 | 24-014 | 24-May-01 | 7. | - | - | ND>23.5 | ND>58.8 | - | - | - | - |
| | 24-016 | 24-May-01 | 15.5 | _ | 61.3 | - | - | - | | - | _ |
| | 24-018 | 24-May-01 | 22. | - | 1.31 | 62.6 ³ | 166. ⁴ | | - | - | - |
| B-23 | 24-041 | 24-May-01 | 23. | - | ND>0.617 | ND>24.7 | ND>61.7 | - | - | _ | - |
| B-24 | 25-048 | 25-May-01 | 23.5 | - | ND>0.649 | ND>26.0 | ND>64.9 | - | - | _ | - |
| | 25-049 | 25-May-01 | 27. | - | ND>0.758 | ND>30.3 | ND>75.8 | - | ND | ND | 3.27 |
| B-25 | 25-078 | 25-May-01 | 6. | - | ND>0.704 | ND>28.2 | ND>70.4 | - | ND | ND | 3.75 |
| | 25-080 | 25-May-01 | 12. | - | ND>0.595 | ND>23.8 | ND>59.5 | _ | - | - | - |
| B-26 | 25-053 | 25-May-01 | 6. | - | ND>0.568 | 460. | 1,360. | - | - | - | - |
| | 25-059 | 25-May-01 | 18. | - | ND>0.543 | ND>21.7 | ND>54.3 | - | | - | |
| | 25-061 | 25-May-01 | 22. | | ND>0.694 | ND>27.8 | ND>69.4 | - | - | - | - |

Table 4
Summary of Analytical Results for Soil Samples - May 2001 Subsurface Investigations

| | | 75. 75 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | May b | | | Analytic | cal Results | mg/kg (ppm) | E BUT TO THE TANK | Contract of the second | 3 20 |
|-------------|--------------------|--|---------------------|------------------|--------------------|---------------------|-------------------|----------------|-------------------|------------------------|-------------|
| | | | Sample | | NW.Meth | Were Miller | | 5. J. A. C. C. | EPA 8260 Total | EPA 8270 Total | EPA 6010 |
| Soil Boring | Sample Number 1 | Sample Date | Depth (feet bgs) | Gas, Diesel, Oil | TPH-Gx Gasoline | Diesel | H-DX | Total BTEX | VOCs (Table E) | PAHs (Table E) | Total |
| PROPERTY OF | "(Whitiber's) | garihie nare | Vicer nazi | Cas' hieser of | r.dasomie: | " Mieselas | W. THE CONTRACTOR | awianie zh. | 4 ranie E\ | Madie EV | Lead |
| B-27 | 25-050 | 25-May-01 | 3. | - | ND>0.562 | 468. ³ | 6,010. | ND | ND | ND | - |
| B-28 | 25-070 | 25-May-01 | 6. | - | 0.829 | 560. | 8,330. | ND | ND | ND | 3.03 |
| | 25-072 | 25-May-01 | 12. | - | 4.24 | 2,340. ³ | 22,200. | - | - | - | - |
| | 25-075 | 25-May-01 | 23. | - | 4.61 | 2,070. ³ | 19,900. | - | - | - | - |
| B-29 | 25-065 | 25-May-01 | 15. | - | ND>0.543 | ND>21.7 | ND>54.3 | - | - | _ | - |
| | 25-067 | 25-May-01 | 23. | - | ND>0.617 | ND>24.7 | ND>61.7 | - | - | - | - |
| B-30 | 24-008 | 24-May-01 | 5. | - | ND>0.617 | - | - | - | _ | - | 5.89 |
| | 24-010 | 24-May-01 | 14. | - | ND>0.543 | - | _ | | - | - | - |
| | | Reference | Level ² | # | 40. | 500. | 500. | varies | varies | varies | # |

Note:

- = not analyzed

= reference level not established

bgs = below ground surface

EPA = U.S. Environmental Protection Agency

HCID = hydrocarbon identification mg/kg = milligrams per kilogram 1 = Sample prefix: 5074-0105

2 = Reference Level based on Level 2 Soil Matrix Value (OAR 340-122-0325)

3 = Hydrocarbon pattern not typical of diesel

4 = Hydrocarbon pattern not typical of oil

ND = not detected above detection limit

NW = Northwest Method

PAHs = polynuclear aromatic hydrocarbons

ppm = parts per million

TPH = total petroleum hydrocarbons

VOCs = volatile organic compounds

Table 5 Summary of Analytical Results for Soil Samples - Petroleum Constituents

| Analytical Methods and | | | | | | | | Reference |
|--------------------------------|------------|----------------|------------|-----------|------------|------------|-----------|---------------------------|
| Barameters | | | Analytical | Results_m | g/kg (ppm) | | | Levels mg/kg (ppm) |
| Boring Number | B-19 | В: | 21 | B-24 | B-25 | B-27 | B-28 | Rhint |
| a Sample Depth (feet bgs) | 21.5 | 5.0 | 18.0 | 27.0 | 6.0 | 3.0 | 6.0 | |
| Sample Number | 24-027 | 24-002 | 24-005 | 25-049 | 25-078 | 25-050 | 25-070 | Lowest RBC * Occupational |
| Sample Date | 24-May-01 | 24-May-01. | 24-May-01 | 25-May-01 | 25-May-01 | 25-May-01 | 25-May-01 | Pathway |
| Northwest Methods | | | | | | | | |
| Gasoline by NW TPH-Gx | ND>0.617 | 1,370. | ND>0.543 | ND>0.758 | ND>0.704 | ND>0.562 | 0.829 | # |
| Diesel by NW TPH-Dx | ND>24.7 | ND>25.7 | - | ND>30.3 | ND>28.2 | 468. | 560. | # |
| Oil by NW TPH-Dx | ND>61.7 | ND>61.7 | - | ND>75.8 | ND>70.4 | 6,010. | 8,330. | # |
| Diesel+Oil> | ND | ND | - | ND | ND | 6,478. | 8,890. | # |
| Total Lead by EPA 6010 3 | - | 4.4 | | 3.28 | 3.75 | - | 3.03 | 1.5 |
| VOCs by EPA Method 8260B or | 8021 | | | | | | | |
| Benzene | ND>0.00309 | 5.2 | ND>0.00272 | ND>0.005 | ND>0.005 | ND>0.005 | ND>0.005 | 0.1 |
| Toluene | ND>0.00309 | ND>0.025 | ND>0.00272 | ND>0.005 | ND>0.005 | ND>0.005 | ND>0.005 | 31,000. |
| Ethylbenzene | ND>0.00309 | 23.4 | ND>0.00272 | ND>0.005 | ND>0.005 | ND>0.005 | ND>0.005 | 47,000. |
| Xylenes | ND>0.00926 | 134.9 | ND>0.00815 | ND>0.010 | ND>0.010 | ND>0.005 | ND>0.010 | 63,000. |
| Naphthalene | - | 11.1 | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 270. |
| MTBE (methyl tert-butyl ether) | - | ND>0.25 | _ | ND>0.010 | ND>0.010 | ND>0.01 | ND>0.010 | 0.16 |
| EDB (1,2-dibromoethane) | | ND>0.025 | _ | ND>0.005 | ND>0.005 | - | ND>0.005 | 1.90E-05 |
| EDC (1,2-dichloroethane) | ļ_ - | ND>0.025 | - | ND>0.005 | ND>0.005 | ļ - | ND>0.005 | 0.013 |
| iso-Propylbenzene | - | 2.58 | - | ND>0.005 | 0.013 | ND>0.005 | ND>0.005 | 300. |
| n-Propylbenzene | 1- | 11.1 | _ | ND>0.005 | 0.021 | ND>0.005 | ND>0.005 | 2,900. |
| 1,2,4-Trimethylbenzene | _ | 59.8 | - | ND>0.005 | ND>0.005 | ND>0.005 | ND>0.005 | 720. |
| 1,3,5-Trimethylbenzene | - | 18.7 | _ | ND>0.005 | ND>0.005 | ND>0.005 | ND>0.005 | 65. |
| PAHs by EPA 8270 | | : | | | | • | | |
| Benzo (a) anthracene | 1- | - | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 2.7 |
| Benzo (a) pyrene | - | _ | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 0.27 |
| Benzo (b) fluoranthene | _ | | | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 2.7 |
| Benzo (ghi) perylene | - | - | <u> </u> - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | # |
| Benzo (k) fluoranthene | 1 | - | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 27. |
| Chrysene | - | i - | _ | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 270. |
| Dibenzo (ah) anthracene | _ | _ | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 0.27 |
| Indeno (1,2,3-cd) pyrene | ;;_ | | | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | |
| Acenaphthene | | . | <u>-</u> | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 25,000. |
| Acenaphthylene | ·_ | ; - | <u>-</u> | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | # |
| Anthracene | _ | - | ļ_ | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 180,000. |
| Fluoranthene | | _ | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 29,000. |

Sampling Results Report Brix Maritime Site

Table 5 Summary of Analytical Results for Soil Samples - Petroleum Constituents

| Analytical Methods an Parameters | d d | | The second of th | l Results im | g/kg (ppm)/ | | | Reference Levels.mg/kg (ppm) |
|-------------------------------------|----------|-------------|--|--------------|-------------|-----------|-----------|------------------------------------|
| Boring Number | B-19 | | B-21 | B-24 | B-25 | B-27 | B-28 | 2017/04/17/2015 |
| Sample Depth (feet bgs |) i 21. | 5.0 | 18.0 | 27.0 | 6.0 | 3.0 | 6.0 | |
| Sample Number 1 | 5 24-02 | 24-002 | 24-005 | 25-049 | 25-078 | 25-050 | -25-070 | Lowest RBC Occupational |
| Sample Date | 24-May | 401 24-May- | 01 24-May-01 | 25-May-01 | 25-May-01 | 25-May-01 | 25-May-01 | Pathway |
| Fluorene | - | _ | | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 23,000. |
| Phenanthrene | - | _ | - | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | # |
| Pyrene | <u>-</u> | - | | ND>0.050 | ND>0.050 | ND>0.050 | ND>0.050 | 21,000. |
| Total PAHs -> | - | _ | | ND | ND | ND_ | ND | # |

Note:

= reference level not established bgs = below ground surface

DEQ = Oregon Department of Environmental Quality

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams/kilogram

ND = not detected above detection limit ind OAR = Oregon Administrative Rules PAHs = polynuclear aromatic hydrocarbon

ppm = parts per million

VOCs = volatile organic compounds

1- Sample prefix: 5074-0105

2 = Reference Level based on lowest DEQ Risk-Based Concentration (RBC) for occupational pathways (OAR 340-122-0244)

3 = Total lead concentrations detected at this site appear to be consistent with naturally occuring concentrations for this area

Bold = Concentration in excess of reference level

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Sampling Results Report Brix Maritime Site

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Table 6
Summary of Analytical Results for Groundwater Samples - May 2001 Subsurface Investigation

| Analytical Methods and Parameters | | | | al Results μ | gll (dqq) llg | | | Reference Levels ug/l (ppb) |
|--|-------------------------|--|--------------------------------------|-------------------------|-----------------|-------------------------|-------------------------|---|
| Boring Number: Screen Interval (feet bgs) Sample Number ¹ | B-14 28-32 29-108 | B_15 24+28 29-104 (Career Control of Career Cont | B-15 duplicate 24-28 29-105 | B-17 24-28 29-109 | 24-28 29-107 | E-19 24-28 24-102 | B-20 24-28 25-103 | Lowest RBC ² Occupational |
| Sample Date | 29-May-01 | -29-May-01 | 29-May-01 | 29-May-01 | 29-May-01 | 24-May-01 | 25-May-01 | Pathway |
| Dissolved Lead by EPA 6010 | - | ND>5.00 | - | ND>5.00 | ND>5.00 | ND>5.00 | ND>5.00 | 15. |
| VOCs by EPA 8260B | | | | | | | | |
| Benzene | ND>1.00 | ND>1.00 | ND>1.00 | 125. | ND>1.00 | ND>1.00 | ND>1.00 | 1. |
| Toluene | 2.06 | ND>1.00 | ND>1.00 | 6.2 | ND>1.00 | ND>1.00 | ND>1.00 | 1,000. |
| Ethylbenzene | ND>1.00 | ND>1.00 | ND>1.00 | 723. | ND>1.00 | ND>1.00 | ND>1.00 | 1,800. |
| Xylenes · | ND>2.00 | ND>2.00 | ND>2.00 | 420.4 | ND>2.00 | ND>2.00 | ND>2.00 | 2,000. |
| Naphthalene | - | ND>0.100 | - | 65.1 | ND>0.111 | ND>0.118 | ND>0.118 | 8.7 |
| MTBE (methyl-t-butyl ether) | 2.39 | ND>2.00 | ND>2.00 | ND>2.00 | ND>2.00 | ND>2.00 | ND>2.00 | 20. |
| EDB (1,2-dibromoethane) | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | 1.40E-03 |
| EDC (1,2-dichloroethane) | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | ND>1.00 | 0.32 |
| iso-Propylbenzene | ND>1.00 | ND>1.00 | ND>1.00 | 115. | ND>1.00 | ND>1.00 | ND>1.00 | 100. |
| n-Propylbenzene | ND>1.00 | ND>1.00 | ND>1.00 | 420. | ND>1.00 | ND>1.00 | ND>1.00 | 100. |
| 1,2,4-Trimethylbenzene | ND>1.00 | ND>1.00 | ND>1.00 | 627. | ND>1.00 | ND>1.00 | ND>1.00 | 23. |
| 1,3,5-Trimethylbenzene | ND>1.00 | ND>1.00 | ND>1.00 | 190. | ND>1.00 | ND>1.00 | ND>1.00 | 23. |
| PAHs by EPA 8270 | | | | | | | | |
| Benzo (a) anthracene | - | ND>0.100 | _ | 0.295 | 0.189 | ND>0.118 | ND>0.118 | 0.17 |
| Benzo (a) pyrene | - | ND>0.100 | - | 0.316 | 0.467 | ND>0.118 | ND>0.118 | 0.017 |
| Benzo (b) fluoranthene | - | ND>0.100 | - | 0.2 | 0.311 | ND>0.118 | ND>0.118 | 0.17 |
| Benzo (ghi) perylene | - | 0.13 | - | 0.284 | 0.778 | ND>0.118 | ND>0.118 | # |
| Benzo (k) fluoranthene | - | ND>0.100 | - | 0.221 | 0.3 | ND>0.118 | ND>0.118 | 1.7 |
| Chrysene | | ND>0.100 | - | 0.347 | 0.3 | ND>0.118 | | 17. |
| Dibenzo (ah) anthracene | - | ND>0.100 | - | ND>0.105 | ND>0.111 | ND>0.118 | ND>0.118 | 0.017 |
| Indeno (1,2,3-cd) pyrene | <u> </u> | ND>0.100 | - | 0.242 | 0.578 | ND>0.118 | ND>0.118 | 0.17 |
| Acenaphthene | - | ND>0.100 | | 0.947 | 0.189 | 0.424 | ND>0.118 | 620. |
| Acenaphthylene | | ND>0.100 | - | 0.232 | ND>0.111 | ND>0.118 | | # |
| Anthracene | _ | ND>0.100 | | 0.326 | ND>0.111 | ND>0.118 | ND>0.118 | 43. |

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Sampling Results Report Brix Maritime Site

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Table 6
Summary of Analytical Results for Groundwater Samples - May 2001 Subsurface Investigation

| Analytical Methods and Parameters | | | Analytic | al Results u | g/l (ppb) | | | Reference Levels ug/l- (ppb) |
|--|-----------------|-------------------|-------------------|--------------------|------------------|--------------------|-----------------------|---|
| Boring Number | B-14 | B-15 | B-15 duplicate | B-17 | B-18 | B-19 | B-20 | |
| Screen Interval (feet bgs) Sample Number | 28-32 29-108 | 24-28 29-104 | 24-28 29-105 | 24-28 29-109 | 24-28 29-107 | 24-28 24-102 | 24-28 25-103 | Lowest RBC ² Occupational |
| Sample Date Fluoranthene | 29-May-01 - | 29-May-01 0.14 | 29-May-01 | 29-May-01 0.811 | 29-May-01 0.4 | 24-May-01 0.129 | 25-May-01 ND>0.118 | Rathway⊬ः 1,800. |
| Fluorene | - | ND>0.100 | - | 0.674 | ND>0.111 | ND>0.118 | ND>0.118 | 410. |
| Phenanthrene | - | 0.11 | | 1.51 | 0.278 | 0.165 | ND>0.118 | # |
| Pyrene | - | 0.26 | - | 1.04 | 0.611 | 0.306 | ND>0.118 | 1,300. |
| Total PAHs | | 0.64 | - | 7.445 | 4.401 | 1.024 | 0. | # |

Note:

= Reference Level not established

bgs = below ground surface

EPA = U.S. Environmental Protection Agency ND = not detected above detection limit indicated PAHs = polynuclear aromatic hydrocarbons

ppb = parts per billion

VOCs = volatile organic compounds

1- Sample prefix: 5074-0105

2 = Reference Level based on lowest DEQ Risk-Based Concentration (RBC) for occupational pathways (OAR 340-122-0244)

Bold = Concentrations in excess of lowest DEQ RBC for occupational pathways

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Sampling Results Report Brix Maritime Site

Table 7 List of Materials Stored and Used on Site

| Material | Location | Average Quantities On Hang |
|-----------------------------|---|-------------------------------|
| Hydraulic Fluid | Warehouse | 40 gallons |
| Antifreeze | Storage room in warehouse | 12 gallons |
| Paint/Thinner | Warehouse in cage | 80 gallons |
| Gasoline | Located in flammable storage locker outside south entrance of warehouse | 20 gallons |
| Kerosene | Stored in shop barge in parts cleaner | 55 gallons |
| Nalcool | Warehouse | 40 gallons |
| 40 wt Oil | Warehouse | 40 gallons |
| AC 500 (Acid-based cleaner) | Storage room in warehouse | 16 gallons |

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Sampling Results Report Brix Maritime Site

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Table 8 Conceptual Site Exposure Model

| Medium | Exposure Pathway | Receptor Scenario | Pathway Retained | Rational |
|--|---|-------------------|------------------|---|
| Soil | Surface Soil Ingestion, Dermal Contact, | Residential | No | Land use is zoned as industrial; residential usage is not reasonably likely |
| | and Inhalation | Occupational | Yes | Soil impacts are present in upper 3 feet of soil |
| | | Excavation Worker | Yes | Soil impacts are present within the depths of potential excavation activities |
| | Volatilization to Outdoor Air | Residential | No | Land use is zoned as industrial; residential usage is not reasonably likely |
| | | Occupational | Yes | Impacted soils are present beneath the site |
| | Vapor Intrusion into Buildings | Residential | No | Land use is zoned as industrial; residential usage is not reasonably likely |
| | | Occupational | Yes | Impacted soils are present adjacent to and beneath a site structure |
| | Leaching to Groundwater | Residential | No | Use of groundwater for consumptive purposes is not reasonable likely |
| The deviation of the second state of the second state of the second seco | | Occupational | No | Use of groundwater for consumptive purposes is not reasonable likely |
| Groundwater | Groundwater Ingestion | Residential | No | Use of groundwater for consumptive purposes is not reasonable likely |
| | | Occupational | No | Use of groundwater for consumptive purposes is not reasonable likely |
| | Groundwater Volatilization to Outdoor Air | Residential | No | Land use is zoned as industrial; residential usage is not reasonably likely |
| | | Occupational | Yes | Groundwater impacts are present beneath the site |
| | Groundwater Vapor Intrusion to Buildings | Residential | No | Land use is zoned as industrial; residential usage is not reasonably likely |
| | | Occupational | Yes | Groundwater impacts are present beneath the site structure |
| | Ingestion and Inhalation from Tapwater | Résidential | No | Use of groundwater for consumptive purposes is not reasonable likely |
| | | Occupational | No No | Use of groundwater for consumptive purposes is not reasonable likely |
| | Groundwater in Excavation | Excavation Worker | No | Groundwater is below the depth (minimum 23.5 feet bgs) of typical construction excavation |

Note: bgs = below ground surface

Table 9 Risk Evaluation of Soil

| Medium | | | Soil – mg/kg (ppn oncentration (RB | 6) | | |
|-------------------------------------|----------------|---|---|-----------------------------------|-----------------------------------|-----------------------------|
| Exposure Pathway, | Ingestion Dern | The thirty be the wife in the an inches | [1] [18] [2] [2] [2] [2] [2] [2] [2] [2] [2] [2 | Vapor Intrusion into Buildings | Maximum Detected | Comparison to Risk-Based |
| Receptor Scenario | Occupational | Excavation Worker | Occupational | Occupational | Concentration in Soil at the Site | Concentration |
| Contaminant of Potential Concern | | | | | | |
| Benzene | 29. | 1,100. | 21. | 0.5 | 5.2 | Exceeds |
| Lead | 1,000. | 1,000. | а | а | 4.4 | Below |

Note:

DEQ = Oregon Department of Environmental Quality

mg/kg = milligrams per kilogram

ppm = parts per million

a = This constituent cannot create an unacceptable risk by this pathway; free product has not been detected at the site.

Table 10 Risk Evaluation for Groundwater

| Medium | G | aroundwater – ug/l (pp | o) | |
|----------------------------------|----------------|-----------------------------------|-----------------------------------|--|
| | DEQ Risk-Based | Concentration (RBC) | | 3 - 15 T |
| Exposure Pathway | Outdoor Air | Vapor intrusion into Buildings | Maximum Detected Concentration in | Comparison to Risk-Based Concentration |
| Receptor Scenario | Occupational | Occupational | Groundwater at the Site | |
| Contaminant of Potential Concern | | | | |
| Benzene | 5,800. | 1,200. | 125. | Below |
| Naphthalene | а | а | 65.1 | Below |
| iso-Propylbenzene | а | а | 115. | Below |
| n-Propylbenzene | а | а | 420. | Below |
| 1,2,4-Trimethylbenzene | а | а | 627. | Below |
| 1,3,5-Trimethylbenzene | а | 18,000. | 190. | Below |
| Benz[a]anthracene | а | а | 0.295 | Below |
| Benzo[a]pyrene | а | а | 0.467 | Below |
| Benzo[b]fluoranthene | а | а | 0.311 | Below |
| Indeno[1,2,3-cd]pyrene | а | а | 0.578 | Below |

Note:

DEQ = Oregon Department of Environmental Quality

ND = not detected above detection limit indicated

ppb = parts per billion
ug/l = micrograms/liter

a = This constituent cannot create an unacceptable risk by this pathway;
 free product has not been detected at the site.

BRIX 001214

Sampling Results Report Brix Maritime Site

Table 11

Comparison of Groundwater Sampling Results to Applicable Surface Freshwater Criteria and Toxicity Values

| (A) (A) (A) (A) (A) (A) (A) (A) (A) (A) | | | Federa | iand State ™W | ater Criteria | | NEW WEEPA | ECOTOX D | itabase 💥 📜 | to a section of the | |
|---|---------------|----------|--------------|----------------|---------------|---|--------------|------------|---------------|---------------------|-----------------------|
| | | | Health USEPA | Health | | 160 160 160 160 160 160 160 160 160 160 | | e finder | | | |
| | | | 1999 | USEPA | 学校文章 处 | Aquatic Life | Aquatic Life | No. of | Species | No. of | |
| | B-17 Groundw | ater | Fish/Water | Drinking | Aquatic Life | Oregon | Lowest | Freshwater | | Criteria/ | Highest |
| | Concentration | n | Consumption | Water MCL | Oregon | Ghronic - | Database | Database | Lowest | Values | Hazard |
| Chemical | (ug/L) | N. (E) | (ug/L) | - (/(ug/L) / € | Acute (ug/L) | (ÿg/L) | Value (ug/L) | → Reports | Value 🚋 | Exceeded | _ε Quotient |
| Benzene | 125 | | 1.2 | 5 | 5300 | N/AV | 1000 | 129 | rotifer | 2 | 104 |
| Toluene | 6.2 | | 6800 | 1000 | 17500 | N/AV | 1000 | 186 | water flea | 0 | 0.01 |
| Ethylbenzene | 723 | <u> </u> | 3100 | 700 | 32000 | N/AV | 1000 | 71 | green algae | 1 | 1.03 |
| Xylenes | 420.4 | | N/AV | 10000 | N/AV | N/AV | 1000 | 194 | water flea | 0 | 0.42 |
| 1,2-dichloroethane | 1 | ND | 0.38 | N/AV | 118000 | 20000 | N/AV | 0 | NA | 0 | 0.00 |
| Isopropylbenzene | 115 | L | N/AV | N/AV | N/AV | N/AV | 1400 | 28 | water flea | 0 | 0.08 |
| n-propylbenzene | 420 | | N/AV | N/AV | N/AV | N/AV | 1550 | 4 | rainbow trout | 0 | 0.27 |
| 1,2,4-Trimethylbenzene | 627 | | N/AV | N/AV | N/AV | N/AV | 7720 | 1 | minnow | 0 | 0.08 |
| 1,3,5-Trimethylbenzene | 190 | | N/AV | N/AV | N/AV | N/AV | 400 | 11 | water flea | 0 | 0.48 |
| Benzo(a)anthracene | 0.295 | | 0.0044 | N/AV | N/AV | N/AV | 1.8 | 3 | water flea | 1 | 67 |
| Benzo(a)pyrene | 0.316 | | 0.0044 | 0.2 | N/AV | N/AV | 1.5 | 17 | water flea | 2 | 72 |
| Benzo(b)fluoranthene | 0.200 | | 0.0044 | N/AV | N/AV | N/AV | N/AV | 0 | NA | 1 | 45 |
| Benzo(ghi)perylene | 0.284 | | 'N/AV | N/AV | N/AV | N/AV | 0.2 | 1 | water flea | 1 | 1.42 |
| Benzo(k)fluoranthene | 0.221 | | 0.0044 | N/AV | N/AV | N/AV | 1.4 | 1 | water flea | 1 | 50 |
| Chrysene | 0.347 | | 0.0044 | N/AV | N/AV | N/AV | 0.7 | 1 | water flea | 1 | 79 |
| Dibenzo(ah)anthracene | 0.105 | ND | 0.0044 | N/AV | N/AV | N/AV | N/AV | 0 | NA | 0 | 0.00 |
| Indeno(123cd)pyrene | 0.242 | | 0.0044 | N/AV | N/AV | N/AV | N/AV | 0 | NA | 1 | 55 |
| Acenaphthene | 0.947 | | 1200 | N/AV | 1700 | 520 | 60 | 34 | midge | 0 | 0.02 |
| Acenaphthylene | 0.232 | | N/AV | N/AV | N/AV | N/AV | N/AV | 0 | NA | 0 | 0.00 |
| Anthracene | 0.326 | | 9600 | N/AV | N/AV | N/AV | 1 | 61 | mosquito | 0 | 0.33 |
| Fluoranthene | 0.811 | | 300 | N/AV | 3980 | N/AV | 4 | 83 | water flea | 0 | 0.20 |
| Fluorene | 0.674 | [, .] | 1300 | N/AV | N/AV | N/AV | 212 | 15 | water flea | 0 | 0.00 |
| Naphthalene | 65.1 | | N/AV | N/AV | 2300 | 620 | 110 | 86 | rainbow trout | 0 | 0.59 |
| Phenanthrene | 1.51 | | N/AV | N/AV | N/AV | N/AV | 19 | 48 | rainbow frout | 0 | 0.08 |
| Pyrene | 1.04 | | 960 | N/AV | N/AV | N/AV | 4 | 13 | water flea | 0 | 0.26 |
| TPAH | 72.65 | | N/AV | N/AV | N/AV | N/AV | NA | NA | NA | N/AV | NA |

^{*1986} version of Federal Water Quality Criteria are adopted by State of Oregon under OAR 340-41-445(2)(p)(B). Federal 1999 criteria for human consumption of fish and water are shown instead of older human health criteria shown in Oregon regulations.

CCC - Criteria Continous Concentration ("Chronic")

MCL - Maximum Contaminant Level

N/AV - Information Not Available

NA - Not Applicable

ND - Not Detected

TPAH - Total Polycyclic Aromactic Hydrocarbons

Table 12
Fate/transport parameters for chemicals exceeding risk screening

| Chemical | Log Organic Carpon Paritioning Coefficient (Koc) | Approximate Mid-Range Aetobic Half- life (days) | |
|----------------------|---|--|--------|
| Benzene | 1.77 | 20 | 1780 |
| Benzo(a)anthracene | 5.60 | 200 | 0.0094 |
| Benzo(a)pyrene | 6.01 | 200 | 0.0016 |
| Benzo(b)fluoranthene | 6.09 | 800 | 0.0015 |
| Benzo(k)fluoranthene | 6.09 | 800 | 0.0015 |
| Chrysene | 5.60 | N/AV | 0.002 |
| Indeno(123cd)pyrene | 6.54 | 1,200 | 0.062 |

Sources:

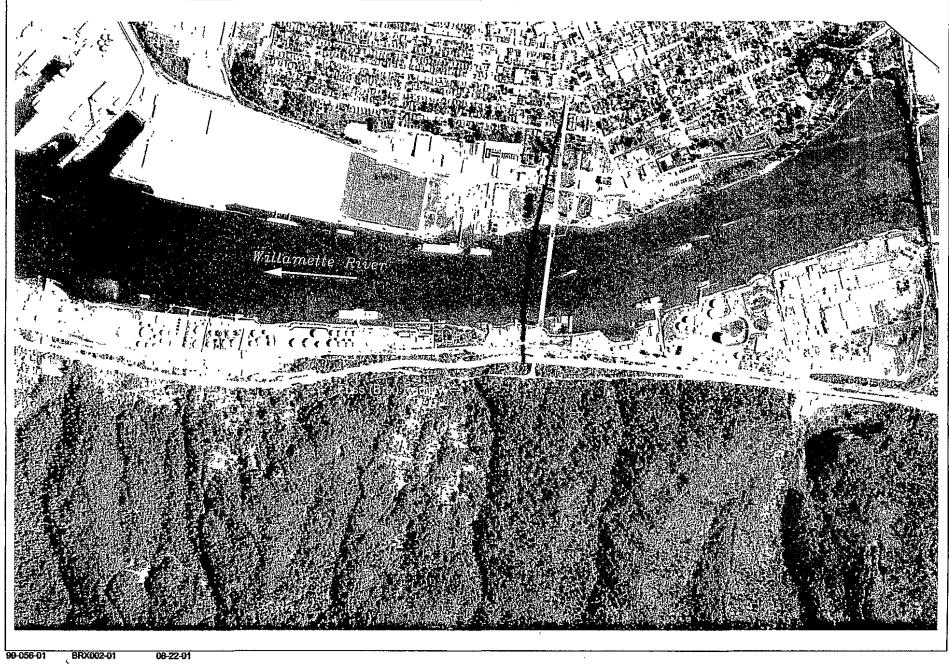
Koc - USEPA 1996

Half life & solubility - HSDB 2001

BRIX 001216

FIGURES

BRIX 001217



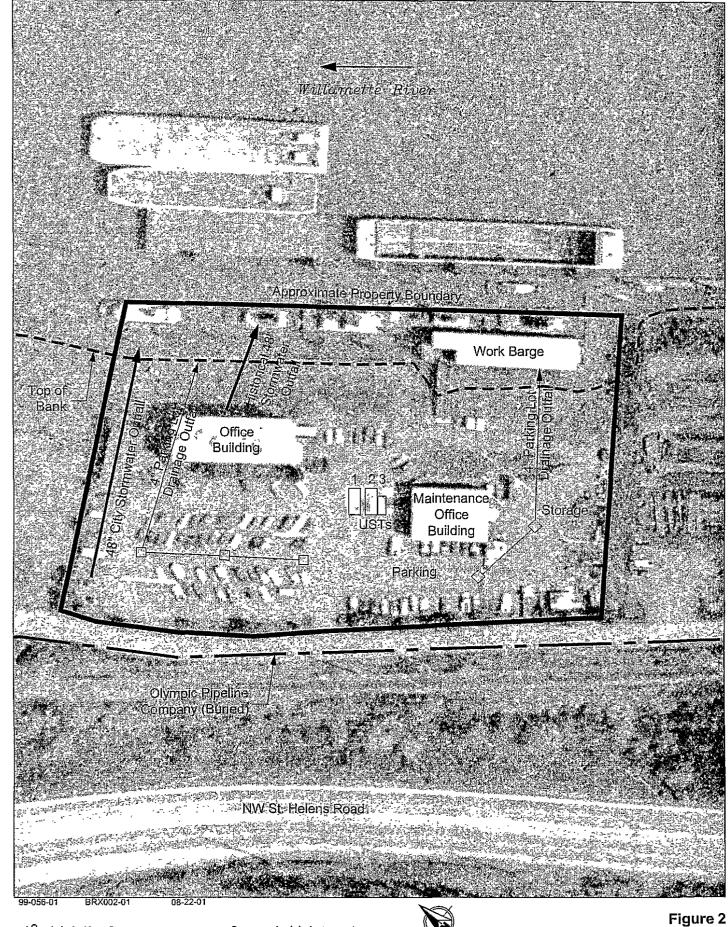






Source: Aerial photograph acquired from the Metro Data Resource Center, Oregon, 1997.

Figure 1 Site Location



ANCHOR ENVIRONMENTAL, L.L.C.

Source: Aerial photograph acquired from WAC, Corp. 1991.



Figure 2 Site Map

BRIX 001219

APPENDIX A

SOIL BORING LOGS

KEY TO BORING LOGS

Soil classification in this report is based upon visual and manual field observations which include moisture, consistency, plasticity and grading estimates and should not be construed to imply field or laboratory testing unless presented herein. Soils are classified in accordance with the Unified Soil Classification System. Stratigraphic boundaries are approximate representations only. No warranty is provided as to the continuity of soil strata between borings.

| | | TATELL COL | OT A COT | DIG A MICO | A GYZOWYZ (TIGOG) |
|----------------------------|--|---------------------------------|----------|------------|--|
| | | UNIFIED SOIL | CLASSI | FICATIO | N SYSTEM (USCS) |
| | MAJOR DIVISIO | ns | GROUP | SYMBOLS | TYPICAL NAMES |
| | GRAVELS | Clean Gravels With Little or | G₩ | | Well Graded Gravels, Gravel-Sand Mixtures |
| COURSE GRAINED | More Than Half the Course Fraction is | No Fines | GP | | Poorly Graded Gravels, Gravel-Sand Mixtures |
| SOILS | Larger Than No. 4 Sieve Size | Gravels With Over 12% Fines | GM | | Silty Gravels, Poorly Graded Gravel-Sand-Silt Mixtures |
| | | | GC | | Clayey Gravels, Poorly Graded Gravel-Sand-Clay Mixtures |
| More Than Half is | SANDS | Clean Sands With Little or | sw | | Well Graded Sands, Gravelly Sands |
| Larger Than #200 Sieve | More Than Half the Course Fraction is | No Fines | SP | | Poorly Graded Sands, Gravelly Sands |
| ; | Smaller Than No. 4 Sieve Size | Sands With Over 12% Fines | SM | | Silty Sands, Poorly Graded Sand-Silt Mixtures |
| | • | | sc | | Clayey Sands, Poorly Graded Sand-Clay Mixtures |
| | SILTS AN | ID CLAYS | ML | | Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity |
| FINE GRAINED | Liquid Limit I | ess Than 50% | CL | | Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays |
| SOILS | | | OL | | Organic Clays and Organic Silty Clays of Low Plasticity |
| More Than Half is | SILTS AN | D CLAYS | МН | | Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts |
| Smaller Than #200 Sieve | Liquid Limit Gr | eater Than 50% | CH | | Inorganic Clays of High Plasticity, Fat Clays |
| | | | ОН | | Organic Clays of Medium to High Plasticity, Organic Silts |
| E | IIGHLY ORGANIC | SOILS | Pt | | Peat and Other Highly Organic Soils |

LEGEND FOR BORING LOGS

Blank Casing Slotted Screen Cement Grout Concrete Bentonite Sand Pack Fill Material

| ABBREV | IATIONS |
|--------------------------|---------------------------------------|
| NA | Not Applicable |
| ND | Not Detected Above Detection Limit |
| NS | Not Sampled |
| PCBs | Polychlorinated Biphenyls |
| ppm | Parts Per Million |
| SPT | Standard Penetration Test |
| $\overline{\mathcal{Z}}$ | Measured Static Water Level in Well |
| T | Estimated Water Level During Drilling |

BRIX 001221

Updated: 8/15/01 File: 5074 B-Log Key

HAHN AND ASSOCIATES, INC.

| | | | | | | | | | | | | | | | |
|------------------------|------------------|------------|--------------------|--|--|--|--|-------------|---------------------------------------|---|---------------|--------------|--|--|--|
| HAHN | | | | INC. | | | e o | | DOD | NG NUMBER B-1 | | | | | |
| 434 NV | | | ıe | | | | aU | بللد | ROK! | NG NUMBER B-1 | | | | | |
| Portlan | - | | | | | | | | | | | | | | |
| | 96-0717 | | | | _ | OGGE | | | | Guy H. Tanz | DRILL | DRILL | | | |
| PROJE | | | | | | LING I | | | | 2 5/8-inch Split Spoon | START | FINISH | | | |
| Brix M | | - | - | | | LING I | | - |): | 2-inch ID Hollow Stem Auger | Time: | Time: | | | |
| 9030 N | | | Road | | _ | PMEN' | r TY | PE_ | <u></u> | 2-inch ID Minuteman | 1730 | 1830 | | | |
| Portlan PROJE | | on 2289 | | | DRIL | LER: LING C | C NICE | ID 4 | OMOD. | R. Crisman Crisman Drilling | Date: | Date: | | | |
| | OI #: | 4289 | | T | DKIL | TITING C | ONI | Ţ . | CIOR: | | 14-Apr-93 | 14-Apr-93 | | | |
| ABANDONMENT DETAILS | س ۔۔ | | 뜅 | ANALYSIS (ppm) | et. | ii | et | GROUNDWATER | | BORING DIAMETER: 5-inch OD | | | | | |
| I SH | SAMPLE NUMBER | 臼 | PA(n) | Hig | F 70 | SAMPLE | (fe | WA | STRATA (USCS) | CASING DIAMETER: Not Applies | | | | | |
| OO | WIN | TIME | ADSPA (ppm) | ANAL (ppm) | SPT s/0.5 | ME | H | | 75. 75. | SURFACE ELEVATION: Not Survey | | | | | |
| PEN | SA | 5-4 | HEADSPACE (ppm) | B A | SPT (blows/0.5 feet) | SAMPLE INTERVAL | DEPTH (feet) | 19 | S. J. | TOP OF CASING ELEVATION: Not Survey | ed | | | | |
| L | <u> </u> | | H | LAB | _ € | | A | | | SOIL DESCRIPTION | | | | | |
| H g | | | | | | | 1 | | Concret | Concrete | | | | | |
| | | | | | - | | | | ፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡፡ | Silty GRAVEL - Brown, moist, loose, non graded, no petroleum odor or stain | -plastic, po | orly | | | |
| (V.V. 6.V.) | | | | | - | | 2 | 1 1 | | graded, no petroleum odor or stain | | | | | |
| | | | | | | | | | | | | | | | |
| Bentonite Chips | | | | | | 1 | 3 | } | | | | | | | |
| Waton W | | | | | | | 4 | | | | | | | | |
| Ber | | | . | | | ! | | | SP | SAND - brown, moist, moderately dense, non-plastic, poorly graded, no petroleum odor or stain (concrete fill) | | | | | |
| | | | | | | | 5 | | | poorly grades, no pearlocal out of stand | T (COTTOT ERE | ш., | | | |
| | | | | <u> </u> | <u> </u> | | | | | | | | | | |
| | | | | <u> </u> | <u> </u> | | 6 | | | | | | | | |
| | | | | | | | 7 | | | Boring abandoned due to auger refusal - concrete fill was observed in sand to 5.0 feet bgs | | | | | |
| | | | | | | | | | | Boring terminated at 5.0 feet - 4/14/93 | | Ų | | | |
| | | | <u> </u> | - | <u> </u> | 1 | 8 | | | Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /14/93 | | | |
| | | <u>-</u> - | | | <u> </u> | <u> </u> | 9 | | | Nr. (| | | | | |
| | <u> </u> | | | | | | | | | Materials: 3/4 bags 3/4-inch Bentonite Chips | | | | | |
| | | | | | |] | 10 | | | 7 | | | | | |
| 1 1 | | | ļ | | <u> </u> | <u> </u> | 11 | | | | | | | | |
| 1 1 | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | ! | <u> 44</u> | | | | | | | | |
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|] } | <u> </u> | | | | - | <u>' </u> | | | | | | · · · | | | |
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Page 1 of 1

File: B-1 2289

| HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon | SO | IL BOR | ING NUMBER B - 2 | | | | | | |
|--|--|---------------------------------|---|--------------|-------------|--|--|--|--|
| (503) 796-0717 | HAI LOGGER: | | Guy H. Tanz | DRILL | DRILL | | | | |
| PROJECT: | SAMPLING METH | IOD: | 2 5/8-inch OD Split Spoon | START | FINISH | | | | |
| Brix Maritime Company | DRILLING METH | OD: | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | | | |
| 9030 NW St. Helens Road | EQUIPMENT TYP | | Canterra CT-250 | 930 | 1030 | | | | |
| Portland, Oregon | DRILLER: | | M. Reniker | Date: | Date: | | | | |
| PROJECT #: 2289 | DRILLING CONT | RACTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 | | | | |
| E 0 | | pr: | BORING DIAMETER: 10-inch OD | | 10 (1p1-50 | | | | |
| AILS PLE BER AE SPACE m) ALYSI (ppm) | RY RY | | CASING DIAMETER: Not Applica | | | | | | |
| (pp (L) PAL | 1 (£ (£ (£ (£ (£ (£ (£ (£ (£ (£ (£ (£ (£ | AT. CSS | SURFACE ELEVATION: Not Survey | | | | | | |
| SAMPLE SAMPLE NUMBER TIME (ppm) B ANALYS | SPT 73/0.5 COVE (%) | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | | | | | | |
| ABANDONMENT DETAILS SAMPLE NUMBER TIME (ppm) LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) | GROUNDWATER STRATA (USCS) | TOP OF CASING ELEVATION: INCLAPPING | iore | | | | | |
| | | [5] | SOIL DESCRIPTION | | | | | | |
| ± 0 | | Asphalt | Asphalt | | | | | | |
| Concrete | | | | | | | | | |
| #S# | 2 | | | | | | | | |
| | | 8 GP | Silty GRAVEL with some Sand - brown, i | noist, mediu | ım | | | | |
| | 3 | | dense, non-plastic, slightly graded, no petroleum odor or stain | | | | | | |
| | | | | | | | | | |
| | 4 | | | | | | | | |
| | 5 | | | | | | | | |
| | 4 100 | | SAND a brown moist medium dense non plastic poorly | | | | | | |
| 15-001 945 3.7 NA | 9 100 6 | SP | SAND - brown, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | | | | |
| | 19 100 |) DE | graded, no petroleum odor or stain. | | | | | | |
| | 7 | | TI MOTOR AND AND AND AND AND AND AND AND AND AND | | | | | | |
| | 9 80 8 | e veri ve | | | | | | | |
| 15-002 950 3.8 NA | 12 100 | | SAND - as above, no petroleum odor or stain | | | | | | |
| 8 | 12 100 9 | Val Zori Nie | | | | | | | |
| Chips | | | | | | | | | |
| D 15-003 1005 3.9 ND | 7 80 | | <u></u> | | | | | | |
| 15-003 1005 3.9 ND | 7 100 11 | SP | SAND - as above, no petroleum odor or st | ain | , | | | | |
| B. B. B. B. B. B. B. B. B. B. B. B. B. B | 5 100 | 17.27 | | | | | | | |
| | 12 | 2.15.4 | | | | | | | |
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| | 14 | | | | | | | | |
| | | | | | | | | | |
| | 15 | | | | | | | | |
| | 3 100 | SP | SAND - as above, strong petroleum odor and black | | | | | | |
| 15-004 1010 4.1 NA | 4 100 16 | | stain | | | | | | |
| | 6 100 | | | | : | | | | |
| | <u> </u> | | | | | | | | |
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| | 20 | 120,44 | <u></u> | BRIX 00 | 1223 | | | | |

Page 1 of 2

File: B-2 2289

|) | HAHN & ASSOCIATES, INC. 34 NW Sixth Avenue SO Portland, Oregon | | | | | | | | | | | |
|--|---|---------------|--|--|--------------|---------------|---------------|-------|----------------------------|--|--------------|-----------|
| 434 NV | V Sixth | Avenu | ıe | | | | \mathbf{so} | Π | BOR | ING NUMBER B - 2 | | |
| Portlar | d, Oreg | on | | | | | | | | | | |
| 1 | 96-0717 | | | | HAI L | OGGE | R: | - | | Guy H. Tanz | DRILL | DRILL |
| PROJE | CT: | | | · | SAME | LING | MET | HO | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ETH | [O] |): | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| ì | W St. H | _ | - | | | PMEN' | | | - | Canterra CT-250 | 930 | 1030 |
| ł | ıd, Oreg | | | | DRIL | | | | | M. Reniker | Date: | Date: |
| PROJE | | 2289 | | | | LING C | TMO | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 |
| E | | | 62 | δĵ. | - C | | _ | 24 | | BORING DIAMETER: 10-inch OE | | Ft 00 |
| Seg | ABANDONMENT DETAILS SAMPLE NUMBER TIME HEADSPACE (ppm) LAB ANALYSIS HCID (ppm) SPT (blows/0.5 feet) RECOVERY (%) DEPTH (feet) GROUNDWATER | | | | | | | | | CASING DIAMETER: Not Applie | | |
| AIL | MADONA AMPLI AMBELI ADSPA ADSPA (ppm) ANAL ID (pp SPT COVEI (%) | | | | | | | | AT. CS | SURFACE ELEVATION: Not Survey | | |
| | SAM SAM NUM TIL TIL TIL (PH (PH (PH (PH (PH (PH (PH (PH (PH (PH | | | | | | | | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | | |
| BAN D | REB CHOW | | | | | | | ROI | \ \(\oldsymbol{\sigma} \) | The state of the s | | |
| 4 | | | Γ | 8 100 | | | | | | SOIL DESCRIPTION | · | |
| | ***** | 1000 | 8 100 | | | | | | | SAND - brown, moist, medium dense, no slightly graded, strong petroleum odor a | n-plastic, | |
| | 15-005 1020 4.1 ND 13 100 21 | | | | | | | | | slightly graded, strong petroleum odor a stain | nd black | |
| | | | - | | | 100 | 22 | | 2.4 | | | |
| | | <u>'</u> | | | | | | | | | | ; |
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| Bentonite Chips | | | | | | | | 5/93 | | | | |
| ### | | <u> </u> | [| | <u> </u> | <u> </u> | 24 | 4/16 | | | | |
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| | <u> </u> | | Ì | | 4 | 100 | i | - | | Silty CLAY - gray, wet, stiff, medium pla | stic. | |
| | 15-006 | 1030 | 4.2 | ND | 5 | 100 | 26 | | | Silty CLAY - gray, wet, stiff, medium pla poorly graded, no petroleum odor or stain | , 1 | |
| | | | | | 8 | 100 | | | | | | : |
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| | | | | | | [| 29 | | | | | |
| ' [| | | | | | | | | | Boring terminated at 25.0 feet - 4/15/93 Sampled to 26.5 feet | | |
| | | | <u> </u> | 1 | <u> </u> | <u> </u> | 30 | | | Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /15/93 |
| | | <u> </u> | - | - | | | 31 | | | | | i |
| 1 | | | <u> </u> | | <u></u> - | <u>'</u> ! | , 01 | | Ì | Materials: 12 bags 3/4-inch Bentonite Chips | - | |
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Page 2 of 2

File: B-2 2289

| 434 NV | ortland, Oregon 03) 796-0717 HAI LOGGER: | | | | | | | | | ING NUMBER B - 3 | | | | | |
|------------------------|--|-------|--|----------------------------|---|-----------------|--|-------------|------------------|---|-------------|-------------|--|--|--|
| i | | | | | HATT | OGGE | R: | | | Guy H. Tanz | DRILL | DRILL | | | |
| PROJE | | | | | | | | HO | D: | 2 5/8-inch OD Split Spoon | START | FINISH | | | |
| 1 | aritime | Comn | any | | | LING M | | | | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: | | | |
| 1 | W St. H | _ | • | | | PMEN | | | | Canterra CT-250 | 1030 | 11115 | | | |
| ì | ıd, Oreg | | | | DRILI | | | | | M. Reniker | Date: | Date: | | | |
| PROJE | | 2289 | | | DRILI | ING C | TMO | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 15-Apr-93 | | | |
| Ę | | | E | SI | £ | | <u></u> | ER | | BORING DIAMETER: 10-inch OI |) | | | | |
| | 母留 | | AC. | ALYSI (ppm) | fee | 3RY | feel | IAT | ₹ @ | CASING DIAMETER: Not Applic | able | | | | |
| I NOT | | TIME | ADSPA (ppm) | A C | SPT s/0.5 | % % | H.(| TD.W | SCS | SURFACE ELEVATION: Not Survey | red | | | | |
| | SAMPLE NUMBER | H | HEADSPACE (ppm) | AB AN. HCID | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applic | able | | | | |
| ABANDONMENT DETAILS | | | 囝 | LAB ANALYSIS HCID (ppm) | - G | PH PH | Ā | GRC | | SOIL DESCRIPTION | | | | | |
| Concrete | | | | | | | 1 | | Asphalt | Asphalt | | | | | |
| 用 語 問 | | | | | | | | | | | | | | | |
| 無ご用 | | | | | | | 2 | 4 . | | Silty CRAVEL with some Sand - brown | maist madi | 1170 | | | |
| | | | | | | | 3 | | GP (| Silty GRAVEL with some Sand - brown, a dense, non-plastic, slightly graded, no pe stain | troleum odo | oror | | | |
| | | | <u>. </u> | - | <u> </u> | | | 1 | | stam | | | | | |
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| | <u> </u> | | <u> </u> | <u> </u> | 4 | 80 | | 1 | C D | SAND - brown, moist, medium dense, non-plastic, poorly | | | | | |
| | 15-007 | 1030 | 4.3 | NA | 8 | 100 | 6 | | SP | SAND - brown, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | | | |
| | | | | <u> </u> | 20 | 100 | 7 | | | | | | | | |
| | | | <u> </u> | | <u> </u> | | | | # 13/F-14 | | | | | | |
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| $M \circ M$ | | | - | <u> </u> | | | 10 | | | | | i | | | |
| MININI Bentonite | | | | | 4 | 100 | | | SP | SAND - as above, no petroleum odor or st | ain | | | | |
| | 15-008 | 1035 | 3.4 | NA | 5 | 100 | 11 | | | · · | | | | | |
| | | | | | 5 | 100 | 12 | | 多数的 | | | | | | |
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| | | | | | | | 15 | | | | | | | | |
| | 75 000 | 10.40 | | 77.4 | 4 | 20 | 10 | | SP | SAND - as above, strong petroleum odor stain | and black | | | | |
| | 15-009 | 1040 | 4.5 | NA | 4 8 | 100 100 | 16 | | | - Court | | ! | | | |
| | | | | | 1 17 | | | | | | | İ | | | |
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| i . | ortland, Oregon | | | | | | | | ימטק | ING NUMBER B - 3 | | |
| | | | | | | | | | | NG NUMBER B - 3 | | |
| | 796-0717 HAI LOGGER: | | | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGE | R: | | | Guy H. Tanz | DRILL | DRILL |
| PROJE | CT: | | | | SAME | LING | METI | OH | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ŒTE | OL |): | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 9030 N | W St. H | elens | Road | | EQUI | PMEN' | r TYI | Œ | | Canterra CT-250 | 1030 | 1115 |
| Portlar | d. Oreg | on | | | DRIL | LER: | | | | M. Reniker | Date: | Date: |
| PROJE | | 2289 | | | | LING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 1 1 |
| Ę-i | | | I | ß | | | | æ | | BORING DIAMETER: 10-inch OD | ! - | |
| 图.,, | æ æ | | S | ANALYSIS | eet | RY | eet) | E | | CASING DIAMETER: Not Applica | | |
| N. I | SAMPLE NUMBER | Œ | ADSPA (ppm) | [4 g | F 75 | [E] | 9. | × | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| 얼됩 | MAK I | TIME | G G | は自 | SPT /8/0.5 | (%) | Ħ | 본 | US. | TOP OF CASING ELEVATION: Not Applica | | |
| ABANDONMENT DETAILS | SZ | _ | HEADSPACE (ppm) | LAB ANALYSI HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ₩. | TOP OF CASING BLEVATION: NOT Applies | inte | |
| AB | | | j-b-i | A T | _ | | | Ü | .,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | SOIL DESCRIPTION | · | |
| | 15 010 | 1050 | 4.2 | ND | 10 | 100 | 21 | | SP | SAND - brown, moist, medium dense, no | n-plastic, | |
| | 15-010 | 1000 | 4.2 | I ND | 5 | 100 | \ <u>21</u> | | | poorly graded, strong petroleum odor and stain | 1 DIACK | |
| | | | | | | 100 | 22 | | | | | |
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| $\ \mathbf{g} \ $ | | | | | | | 23 | | | | | |
| Bentonite Chips | | | | | <u> </u> | 1 | ļ | | | | | |
| | | | | <u> </u> | <u>i </u> | <u> </u> | 24 | | 300 | | | |
| [] to [] | | | • | - | | | 25 | 4/15/93 | | | | |
| | | | <u> </u> | <u> </u> | 2 | 100 | 1 40 | 77 | 7777777 | Silty CLAV - grow wat stiff madium pla | stio | |
| and the second | 15-011 | 1100 | 4.1 | ND | 3 | 100 | 26 | V | | Silty CLAY - gray, wet, stiff, medium pla poorly graded, no petroleum odor or stair | l | i |
| | | | | | 5 | 100 | Ì | | | | | |
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| | | | | | | | 1 | | | Boring terminated at 25.0 feet - 4/15/93 | | |
| | | | | | | 1 | 30 | | | Sampled to 26.5 feet Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /15/93 |
| | | | | ļ | <u> </u> | | | | | _ | - | İ |
| <u> </u> | | | <u> </u> | <u> </u> | <u> </u> | l | 31 | | | Materials: | | l |
|]] | | |] | | | 1 | 32 | | | 12 bags 3/4-inch Bentonite Chips | | Ī |
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| PROJE | 96-0717 | | | | | OGGE | | ייים | | Guy H. Tanz | | DRILL | DRILL |
| 1 | | ~ | | | | | | | | 2 5/8-inch OD Split Spoon | ···· | START | FINISH |
| | aritime | _ | _ | | | LING M | | | <u>: </u> | 4 1/4-inch ID Hollow Stem Au | ıger | Time: | Time: |
| | W St. H | | Road | | | PMEN' | TY | PE_ | | Canterra CT-250 | <u></u> | 1130 | 1220 |
| | nd, Oreg | | | | DRIL | | 03.70 | | | M. Reniker | | Date: | Date: |
| PROJE | GCT #: | 2289 | | - | DRIL | LING C | ON.T | | JTOR: | Geo-Tech Explorations, Inc. | | 15-Apr-93 | 15-Apr-93 |
| I E | ١ . ١ | | 贸 | ANALYSIS ID (ppm) | et) | | 至 | EE | | BORING DIAMETER: | 10-inch OD | | |
| I S | 日間 | ဓ | A C | ALYSI (ppm) | f. | ER | (fe | NA. | TA S) | CASING DIAMETER: | Not Applica | | <u></u> - |
| 1 ST | ME | TIME | ADSP4 (ppm) | N O | SPT s/0.5 | | 띰 | | STRATA (USCS) | SURFACE ELEVATION: | Not Survey | | |
| N N N | SAMPLE NUMBER | Ŧ | HEADSPACE (ppm) | AB AN HCID | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | . P. (5) | TOP OF CASING ELEVATION: | Not Applica | ıble | |
| ABANDONMENT DETAILS | | | 呂 | LAB | [e] | ~ | Ä | GR | | SOIL DE | SCRIPTION | | |
| Concrete | | | | | | | | | Asphalt | Asphalt | | | |
| 田 a 田 | | | | <u> </u> | 1 | <u>i</u> | 1 | 1 | | | | • | |
| ##S# | | | | ļ . <u> </u> | | | 2 | | GP | Silty GRAVEL with some Sa dense, non-plastic, slightly g | and - brown, n | noist, medi | um r or |
| | | | <u> </u> | 1 | 1 | | | 1 | | stain | raded, no peo. | TOTELLITE OUT | 1 01 |
| | | | | | | | 3 | | | | | | |
| | | | | ļ <u> </u> | ļ | - | | | | | | | |
| | | | | <u> </u> | <u> </u> | | 4 | - | | | | | |
| | | | · · | | | | 5 | | | | | | |
| | | | <u> </u> | <u> </u> | 4 | 20 | | 4 | | SAND - brown, moist, medium dense, non-plastic, poorly | | | |
| | 15-012 | 1130 | 3.7 | NA | 10 | 100 | 6 | | SP | SAND - brown, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | |
| | | | | | 10 | 100 | |] | | | | | |
| | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 7 | | | | | | |
| | | | <u> </u> | | | | 8 | | | | | | į |
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| Chips | | | | | | | | | | | | | |
| | | | | | | | 10 | ! | | | | | |
| minim entonite | 15-013 | 1140 | 3.5 | NA. | 9 | 100 | 11 | | SP | SAND - as above, no petrole | um odor or st | ain | |
| | 19-019 | 1140 | 3.5 | I MAL | 9 | 100 | 11 | | | | | | |
| | | | | | | | 12 | | | | | | |
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| | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 14 | | ing of the | | | | 1 |
| | | | | - | <u> </u> | | 15 | | 建設的 地 | | | | |
| | | | | \ | 12 | 100 | | | | SAND - as above, no petrole | eum odor or st | ain | } |
| | 15-014 | 1150 | 3.9 | NA | 13 | 100 | 16 | | SP | | | | |
| | | | | | 12 | 100 | | | 和Kodely Ankodely | | | | 1 |
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| | | | | | | | 20 | | maring Viewer | | В | RIX 001 | 227 |

| 434 NV | W Sixth And, Oreg | Avenu | | INC. | | | so | ı | BOR | NG NUMBER B - 4 | |
|------------------------|-------------------|-------------|--------------------|----------------------------|-------------------------|-----------------|--------------|-------------|--|--|----------|
| (503) 7 | 96-0717 | | | | HAI L | OGGEI | ₹: | | | Guy H. Tanz DRILL DRIL | L |
| PROJE | CT: | | | | SAMP | LING I | MET | HOI | D: | 2 5/8-inch OD Split Spoon START FINIS | SH |
| | aritime | | - | | DRILL | LING M | ETF | OD | <u>: </u> | 4 1/4-inch ID Hollow Stem Auger Time: Time: | |
| 9030 N | W St. H | elens . | Road | | EQUI | PMENT | YT. | PΕ | | Canterra CT-250 1130 1220 | 0 |
| | id, Oreg | | | | DRILI | | _ ~ • | | | M. Reniker Date: Date | - |
| PROJE | CCT #: | 2289 | | T | DRILI | TNG C | TNO | | CTOR: | Geo-Tech Explorations, Inc. 15-Apr-93 15-Apr | -93 |
| ABANDONMENT DETAILS | ~. | | 到 | LAB ANALYSIS HCID (ppm) | et) |] _{≱;} | et) | GROUNDWATER | | BORING DIAMETER: 10-inch OD | |
| I S | SAMPLE NUMBER | 图 | PA(n) | ALYSI (ppm) | 7. fe | EH (| (fe | WA | STRATA (USCS) | CASING DIAMETER: Not Applicable | |
| l gg | | TIME | ADSPA (ppm) | A P | SPT s/0.5 | ΩΩ (%) | TH. | 2 | IRA JSC | SURFACE ELEVATION: Not Surveyed | |
| AND D | N S | <u>.</u> ., | HEADSPACE (ppm) | AB AN HCID | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | SOU | 25 E | TOP OF CASING ELEVATION: Not Applicable | _ |
| 🛱 | | | j±i | LA | 8 | | I | Œ | | SOIL DESCRIPTION | |
| | | | | | 10 | 20 | | | SP | SAND - brown/gray, moist, medium dense, non- | |
| | 15-015 | 1158 | 4.4 | ND | 11 | 100 100 | 21 | | 20 | plastic, poorly graded, no petroleum odor or stain | |
| | | | | | | 250 | 22 | | | | |
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| | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 23 | 3 1 | | | |
| | | | | | | | 24 | 4/15/93 | | | |
| | | | | | | | | | | | |
| Bentonite Chips | | <u>-</u> | <u> </u> | | 0 | 100 | 25 | Y | CL | CUT, CT LT | |
| | 15-016 | 1205 | 3.7 | NA | 1 | 100 | 26 | | Million of the Control of the Contro | Silty CLAY - gray, wet, soft, medium plastic, poorly graded, no petroleum odor or stain | |
| | | | | | 1 | 100 | | 1 | | | |
| | | | | <u> </u> | | <u>j</u> | 27 | | | | |
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| ıİ | | | | | | | |] | | | |
| }} | | | | <u> </u> | <u> </u> | <u> </u> | 29 | | | Boring terminated at 25.0 feet - 4/15/93 | ļ |
| .) | - | | | | | | 30 | | | Sampled to 26.5 feet Boring abandoned with 3/4-inch Bentonite Chips - 4/15/93 | i |
| | | | | | | | | 1 | | boring abandoned with 3/4-inch Bentonite Chips - 4/15/93 | ı |
| ' } | | | | | <u> </u> | <u> </u> | 31 | | | Materials: | <u> </u> |
| ıl | _ | | - | | | | 32 | | | 12 bags 3/4-inch Bentonite Chips | ĺ |
| l | | | | | | | | | | | - |
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| Ί | <u> </u> | | <u> </u> | | l J | | 36 | | | | j |
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| <u> </u> | | | | | <u> </u> | | 40 | | | BRIX 001228 | |

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| | & ASS | | | INC. | | | so | — П | BOR | ING NUMBER | B - 5 | | |
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| Portlan | ıd, Oreg | on | | | | | | | | | | | |
| | 96-0717 | | | | HAI I | OGGE | R: | | | Jeff W. Doss | | DRILL | DRILL |
| PROJE | CT: | | | | SAME | LING | MET. | HO | D: | 2 5/8-inch OD Split Spoon | · · · · · · · · · · · · · · · · · · · | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ÆTE | IOE | : | 4 1/4-inch ID Hollow Stem At | nger | Time: | Time: |
| | W St. H | _ | - | | EQUI | PMEN' | r TY | PE | | Canterra CT-250 | <u> </u> | 1315 | 1405 |
| Portlan | ıd, Oreg | on | | | DRIL | | | | | M. Reniker | | Date: | Date: |
| PROJE | | 2289 | | | DRIL | LING C | ONI | RA | CTOR: | Geo-Tech Explorations, Inc. | | 15-Apr-98 | 15-Apr-93 |
| Į. | | | re-t | Si | 3 | | | 照 | · · · · · · · · · · · · · · · · · · · | BORING DIAMETER: | 10-inch OD | | |
| E S | 短货 | | \$CI | ALYSI (ppm) | fee | RY | feet | A-TI | ₩ (| CASING DIAMETER: | Not Applica | ıble | |
| NO | FT (E) | TIME | ADSPA (ppm) | AI (p | SPT s/0.5 | OVE (%) | H(| MO | AT. | SURFACE ELEVATION: | Not Survey | | |
| NO THE | SAMPLE NUMBER | TI | HEADSPACE (ppm) | AB AN HCID | WE SS | RECOVERY (%) | DEPTH (feet) | 15 | STRATA (USCS) | TOP OF CASING ELEVATION: | | | |
| ABANDONMENT DETAILS | ωZ | | 田 | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | R. | E | GROUNDWATER | עט – | | | | |
| | | | | | | | <u> </u> | 10 | 4 1 - 16 - | <u> </u> | SCRIPTION | | |
| Concrete | | | <u> </u> | ļ | - | - | 1 | | Asphalt | Asphalt | | | |
| 世質田 | | | | - | ' - | | | 1 | | Silty CRAVET with some S | and hasan m | | |
| #ÿ# | | | | | | | 2 | | 8 GP 8 ∞∞∞∞ | Silty GRAVEL with some S dense, non-plastic, slightly | graded, no pet | roleum odo | ror |
| | | | <u> </u> | <u> </u> | ļ | <u> </u> | } | | | stain , | | | |
| | | | | <u> </u> | | 1 | 3 | 4 | | | | | |
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| | | | | | | | | 1 | | | | | |
| | | | | | | | 5 | | 4.6 | | | | |
| | 15-017 | 1327 | 2 | NA | 6 | 80 | 6 | | SP | SAND - brown, moist, medium dense, non-plastic, poorly graded, no petroleum odor or stain | | | |
| | 19-017 | 1041 | 4 | INA | 6 | 100 | 1 0 | | 475 | graveu, no pen oream own or seam | | | |
| | | | | | - | | 7 | | | | | | |
| | | | | | | | |] , | | | | | |
| | | | | | <u> </u> | <u> </u> | 8 | | IALVE SP | | | | |
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| Chips | | | | | | | | 1 1 | | | | | |
| | | | | | 1 | | 10 | | 555 | | | | |
| | | 7000 | 10 | 1 | 6 | 0 | | | SP | SAND - as above, no petrole | eum odor or sta | ain | |
| Bentonite | 15-018 | 1333 | 1.8 | ND | 11 14 | 100 | 11 | | 多表验 | | | | |
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| | | | ! | <u> </u> | <u> </u> | | 14 | | 感见者 | | | | |
| | | | | | | | 15 | | 新闻士 | | | | |
| | i | | | _ | 6 | 0 | | | SP | SAND - as above, no petrolo | eum odor or st | ain | |
| | 15-019 | 1339 | 2.2 | NA | 8 | 100 | 16 | | | | | | |
| | | | | | 12 | 100 | 17 | | | | | | |
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| TOT A TOTAL | P. A C.C. | OCTA | mee | TNICT | | | | | - | | | | |
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| 4 | & ASS | | | HNC. | | | ടവ | Т | BODi | NG NUMBER | B - 5 | | ļ |
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| | id, Oreg | | | | TT 1 = - | OCCT. | D. | | | I COTI D | | DD==== | |
| | 96-0717 | | | | | OGGE | | | | Jeff W. Doss | | DRILL | DRILL |
| PROJE | | <u> </u> | | | ļ | LING | | | | 2 5/8-inch OD Split Spoon | | START | FINISH |
| | aritime | _ | • | | | LING M | | |) <u>:</u> | 4 1/4-inch ID Hollow Stem A | ıger | Time: | Time: |
| 4 | W St. H | | Road | | | PMENT | נציד יו | PE. | | Canterra CT-250 | | 1315 | 1405 |
| | d, Oreg | | | | DRILI | | | | | M. Reniker | | Date: | Date: |
| PROJE | (CT'#: | 2289 | - | | DRIL | LING C | UNT | т | UTOR: | Geo-Tech Explorations, Inc. | | 15-Apr-93 | 15-Apr-93 |
| TN | | | 闰 | ANALYSIS ID (ppm) | et. | > | - | 臣 | | BORING DIAMETER: | 10-inch OD | | |
| EST | SAMPLE NUMBER | 떮 | HEADSPACE (ppm) | AB ANALYSI HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | [₹ | STRATA (USCS) | CASING DIAMETER: | Not Applica | | |
| TAI | | TIME | ADSPA (ppm) | N C | SPT s/0.5 | S S | Ħ | P | RA | SURFACE ELEVATION: | Not Survey | | |
| | SA | E⊶ | AI | GE | SW.O | EG . | Α̈́ | 5 | F S | TOP OF CASING ELEVATION: | Not Applica | ıble | |
| ABANDONMENT DETAILS | | | 田 | LAB | 9 | 24 | Ā | GROUNDWATER | | ישת חספ | SCRIPTION | | |
| mmm | | | <u> </u> | <u> </u> | 4 | 20 | | <u> </u> | 14.5 | | | | |
| | 15-020 | 1345 | 2.1 | ND | 6 | 100 | 21 | | SP | SAND - brown/gray, medit slightly graded, no petrolet | m dense, non- im odor or star | plastic, in | 1 |
| | | | | <u> </u> | 7 100 | | | | | | | | |
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|] | | | | | | | 25 | | | Boring terminated at 20.0 | foot 4/15/09 | | ļ |
| | | | | | | ļ | | | | Sampled to 21.5 feet Boring abandoned with 3/4 | Teer - 4719/93 | | |
| , | | | | | <u>[</u> | <u> </u> | 26 | 1 | | Boring abandoned with 3/4 | Linch Bentonii | te Chips - 4 | /15/93 |
| | | | | | | - | 27 | | | Materials: | | | 1 |
| } | | | | Ì | Ì | | | 1 | | 10 bags 3/4-inch Bentonite | Chips | | |
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| 1 | & ASS | | | INC. | | | 20 | TT | BODI | ING NUMBER B - 6 | | | | | | |
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| 1 | Sixth A | | ıe | | | | IJŪ | بيلك | DUK | NG NUMBER B - 6 | | | | | | |
| .i | d, Oreg | | | | TTAYT | OCCET | | - | | Jeff W. Doss | DDITT | | | | | |
| (503) 79 PROJE | | | | | | OGGEI | | יסנ | <u>, </u> | | DRILL | DRILL | | | | |
| Brix M | | Co | | | | LING N | | | | | START lime: | FINISH | | | | |
| 9030 N | | - | _ | | | | | | <u> </u> | 4 1/4-inch ID Hollow Stem Auger Canterra CT-250 | 1420 | Time: | | | | |
| l} | | | Road | | ⊢ | PMENT | 1.11 | 115 | | M. Reniker | Date: | 1515 | | | | |
| Portlan PROJE | | $\frac{\mathrm{on}}{2289}$ | | | DRILI | LING C | ONT | RAG | TOR: | | 15-Apr-93 | Date: 15-Apr-93 | | | | |
| · | <u> </u> | 2200 | | 202 | | | | $\overline{}$ | | BORING DIAMETER: 10-inch OD | 15 11pt-55 | 10-Wht-99 | | | | |
| SEN | 52 PG | | S | ANALYSIS ID (ppm) | feet | RY | eet) | YIE | 4! → | CASING DIAMETER: Not Applicab | ole. | | | | | |
| AIL | | TIME | ADSPA (ppm) | [∰ ∰ | SPT s/0.5 | OVE (%) | H (f | 7MC | AT. | SURFACE ELEVATION: Not Surveyed | | | | | | |
| ON THE | SAMPLE NUMBER | TI. | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | ws/(| RECOVERY (%) | DEPTH (feet) | NS | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applicab | | | | | | |
| ABANDONMENT DETAILS | o z | | Ħ | LAB | SPT (blows/0.5 feet) | RF | H | GROUNDWATER | O ₂ - | SOIL DESCRIPTION | | | | | | |
| | | | <u> </u> | | | | <u> </u> | | Asphalt | | | | | | | |
| Concrete | | | | <u> </u> | | | 11 | | | - Amparet | | | | | | |
| 井真田 | | | | | [| | | | GP) | Silty GRAVEL with some Sand - brown, moist, medium | | | | | | |
| 共"(共 | . ! | | | <u> </u> | 1 | | 2 | | | dense, non-plastic, slightly graded, no petroleum odor or stain | | | | | | |
| | | | - | | <u> </u> | | 3 | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | <u> </u> | <u> </u> | <u> </u> | | 4 | | ace part to contact to | | | | | | | |
| | <u> </u> | | | <u> -</u> | | | 5 | | 多安装 | | | | | | | |
| | <u> </u> | | <u> </u> | | 2 | 0 | | | SP | SAND - brown, moist, very loose, non-plastic, poorly | | | | | | |
| | 15-021 | 1425 | 2.7 | NA | 1 | 20 | 6 | | | SAND - brown, moist, very loose, non-plastic, poorly graded, no petroleum odor or stain | | | | | | |
| | | | | | 1 | 100 | 7 | | | | | | | | | |
| | | | <u> </u> | ! ! | | | <u>'</u> | | | | | | | | | |
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| Chips | <u> </u> | | <u>j</u> | <u> </u> | <u> </u> | | 9 | | 73-04-03 | | | [| | | | |
| | | | | | | | 10 | | | | | | | | | |
| Waite (| | | | | 2 | 0 | | | SP | SAND - as above, gray, petroleum odor and | stain | į | | | | |
| Mhilli Bentonite | 15-022 | 1431 | 2.4 | ND | 1 | 100 | 11 | | | | | 1 | | | | |
| | | | | | 2 | 100 | 12 | | | | | 1 | | | | |
| | | | | | | | | | | | | 1 | | | | |
| | | | | | | | 13 | | | | | 1 | | | | |
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| | | | | | | | 7-4-1 | | | | | | | | | |
| | | | | | | | 15 | | 建设 集 | | | 1 | | | | |
| | | == | | | 9 | 0 | | | SP | SAND - as above, medium dense, petroleum and stain | n odor | 1 | | | | |
| | 15-023 | 1437 | 2.5 | ND | 11 15 | 20 100 | 16 | | | and stant | | 1 | | | | |
| | | | | <u> </u> | TO | 700 | 17 | | | | | - | | | | |
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| HAHN | | | | INC. | | | | | | | | | | | |
| 434 NV | Sixth A | Avenu | ıe | | | | so | Щ | B - 6 | | | | | | |
| Portlan | d, Oreg | on | | | <u></u> | | | | | | | | | | |
| (503)79 | 96-0717 | | | | HAIL | OGGE | R: | | | Jeff W. Doss | | DRILL | DRILL | | |
| PROJE | CT: | | | | SAMP | LING | METI | OF | D: | 2 5/8-inch OD Split Spoon | | START | FINISH | | |
| Brix M | aritime | Сотр | any | | DRILI | ING M | ŒTH | OD | : | 4 1/4-inch ID Hollow Stem Au | ger | Time: | Time: | | |
| 1 | W St. H | | | | EQUI | PMEN' | r TYI | Œ | | Canterra CT-250 | | 1420 | 1515 | | |
| Portlan | d, Oreg | on | | | DRILI | | | | | M. Reniker | | Date: | Date: | | |
| PROJE | | 2289 | | | | ING C | ONT | RAG | CTOR: | Geo-Tech Explorations, Inc. | | 15-Apr-93 | 15-Apr-93 | | |
| E: | | | | Ω | | | | 出 | | BORING DIAMETER: | 10-inch OD | | | | |
| | 田田 | | Ö | ANALYSIS | eet | RY | eet) | \TE | ₩ | CASING DIAMETER: | Not Applica | | | | |
| N N N | H H H | TIME | E CE | F F | F 2 | OVE (%) | I (f | W/ | AT. CS) | SURFACE ELEVATION: | Not Survey | | | | |
| | SAMPLE NUMBER | T | ADSPA (ppm) | A E | SPT vs/0.5 | RECOVERY (%) | Ę | JN. | STRATA (USCS) | TOP OF CASING ELEVATION: | | | | | |
| ABANDONMENT DETAILS | ᅈᅜ | | HEADSPACE (ppm) | LAB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | E E | DEPTH (feet) | GROUNDWATER | ω) | 101 01 ORBING ELESTRICIT. | Troorippines | thic | · | | |
|] F | | | 3-4 | 7 | | | | (£) | | SOIL DES | CRIPTION | | ; | | |
| | | | | | 3 | 0 | Ţ | | | SAND - gray, moist. loose, r | ion-plastic, po | orly | | | |
| | 15-024 | 1445 | 2.3 | NA. | 3 | 100 | 21 | | SP | graded, slight petroleum od | or and stain | • | | | |
| | | | | ļ <u>.</u> | 4 | 100 | 22 | | | | | | | | |
| | <u>.</u> | | <u> </u> | | <u>!</u> _ | | | တ္ | 100 | | | | | | |
| | | | | | | | 23 | 1/15/93 | | | | | Ì | | |
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| Bentonite Chips | | | | | <u> </u> | <u> </u> | 24 | \mathbf{V} | | | | | | | |
| [[to [] | | | <u> </u> | - | | | 25 | | | | | | | | |
| | <u> </u> | |] | <u> </u> | 3 | Ō | | | | Silty CLAY - gray, wet, firm | ı, medium pla | stic. | | | |
| Month. | 15-025 | 1456 | 2.2 | NA | 4 | 100 | 26 | | CL Silty CLAY - gray, wet, firm, medium plastic, poorly graded, possible petroleum odor and stain | | | | | | |
| | | | | | 4 | 100 | | | | | | | | | |
|] | | | | | | <u> </u> | 27 | | | | | | | | |
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|] } | | | | | | | 29 | | | | | | į | | |
| į į | | | | | | | | | | Boring terminated at 25.0 for Sampled to 26.5 feet | eet - 4/15/93 | | 1 | | |
| | | | <u> </u> | | | <u> </u> | 30 | | | Boring abandoned with 3/4- | inch Bentonit | e Chips - 4 | /15/93 | | |
| | | | ļ | <u> </u> | | | 31 | | | | | | | | |
| | | | | | <u> </u> | <u> </u> | 27 | | | Materials: 12 bags 3/4-inch Bentonite (| Thing | | | | |
| l j | | | | | | | 32 | | | 12 bags 3/4-men Bencomite (| ∍mps | | 1 | | |
| 1 1 | | | | | | | | | | | | | į | | |
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| } | <u> </u> | | } | <u> </u> | <u> </u> | | 34 | | | | | | ł | | |
| <u> </u> | | | - | - | | | 35 | | | | | | ł | | |
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| [} | | | | <u> </u> | <u></u> | | 38 | | | | | | | | |
| (| <u>-</u> <u> </u> | | | - | <u> </u> | <u> </u> | 90 | | | | | | | | |
| <u> </u> | | | | | | | 39 | İ | | | | | 1 | | |
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| | & ASS | | • | INC. | | | so | IL. | BOR | NG NUMBER B - 7 | | | | | | |
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| Portlar | ıd, Oreg | on | | | | = | | | | | | - [| | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGEI | R: | _ | | Jeff W. Doss D | RILL | DRILL | | | | |
| PROJE | CT: | | | | SAMP | LING I | METI | 101 |): | 2 5/8-inch OD Split Spoon S7 | TART | FINISH | | | | |
| Brix M | aritime | Comp | any | | DRILI | LING M | ETH | (OD | : | 4 1/4-inch ID Hollow Stem Auger Tin | me: | Time: | | | | |
| 9030 N | W St. H | elens | Road | | EQUI | PMENT | r Tyi | PΕ | | Canterra CT-250 | 1530 | 900 | | | | |
| | id, Oreg | on_ | | | DRIL | ER: | | | | M. Reniker | Date: | Date: | | | | |
| PROJE | CT #: | 2289 | | | DRILI | ING C | ONT | RAC | CTOR: | Geo-Tech Explorations, Inc. 15- | -Apr-93 | 16-Apr-93 | | | | |
| Į.N | | | 压 | SE (2) | ਜ਼ੁ | 2 | <u> </u> | ER | | BORING DIAMETER: 10-inch OD | | | | | | |
| ES E | SAMPLE NUMBER | F5.21 | HEADSPACE (ppm) | AB ANALYSI TPH-G (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | 'AT | ₹ 60 | CASING DIAMETER: Not Applicable | : | | | | | |
| PAL | | TIME | ADSPA (ppm) | A. C. | SPT rs/0.5 | (%) | H. | DW | STRATA (USCS) | SURFACE ELEVATION: Not Surveyed | | | | | | |
| NE DE | \$ E | Ę | A o | A.H. | S W |) EC(| Į. | | | TOP OF CASING ELEVATION: Not Applicable | 3 | | | | | |
| ABANDONMENT DETAILS | 92 74 | | 目 | LAB ANALYSIS TPH-G (ppm) | e e | R | ŭ | GROUNDWATER | | SOIL DESCRIPTION | | | | | | |
| lt e | | | | | | | 1 | | Asphalt | Asphalt | | | | | | |
| Concrete | | | | | | | 2 | | GP. | Silty GRAVEL with some Sand - brown, moist dense, non-plastic, slightly graded, no petrole | t, mediu | ım. | | | | |
| | | | | | ì | - | | | | stain | din odo | . 01 | | | | |
| | | | | | <u> </u> | <u> </u> | 3 | | | | | | | | | |
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| | | | <u> </u> | <u> </u> | | | 5 | | | | | | | | | |
| | | | | | 5 | 0 | | | SP | SAND - gray, moist, medium dense, non-plas | stic, poo | rly | | | | |
| | 15-026 | 1535 | 7.9 | NA | 6 | 100 | 6 | | 特整数 | graded, no pétroleum odor or stain | | 1 | | | | |
| | | | - | | - | 100 | 7 | | | | | | | | | |
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| hips | , | | <u> </u> | | <u>i</u> | | 9 | | | | | | | | | |
| | | | | | | | 10 | | | | | | | | | |
| Bentonite C | | | | | 12 | 0 | | | SP | SAND - as above, dense, petroleum odor and s | stain | | | | | |
| | 15-027 | 1543 | 53 | 270 | 20 | 80 | 11 | | | | | | | | | |
| | | | | - | 18 | 100 | 12 | | | | | | | | | |
| | | | | |) | <u>'</u> | 12 | | | | |] | | | | |
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| | | | | - - | | | 15 | | | | | 1 | | | | |
| | <u> </u> | | <u>. </u> | | 7 | 0 | | | ar. | SAND - as above, petroleum odor and stain | | l | | | | |
| | 15-028 | 1550 | 755 | 2,000 | | 100 | 16 | | SP | | | | | | | |
| | | | | | 11 | 100 | | | | | | 1 | | | | |
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| 4 | V Sixth . | | | MIO. | | | so | П | BOR | ING NUMBER B - 7 | | |
| i | id, Oreg | | | | | | _ | | | | | |
| | 96-0717 | | | | HAI L | OGGE | R: | | | Jeff W. Doss | DRILL | DRILL |
| PROJE | CT: | | | | SAMP | LING | MET | HOI | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ŒTE | OD | : | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 1 | W St. H | _ | | | EQUI | PMEN' | נידי | PΕ | | Canterra CT-250 | 1530 | 900 |
| | id, Oreg | on | | | DRILI | LER: | | | | M. Reniker | Date: | Date: |
| PROJE | CT #: | 2289 | | | DRIL | LING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. | 15-Apr-93 | 16-Apr-93 |
| E | | | 闰 | Sis | 1 | ~ | 3 | ER | | BORING DIAMETER: 10-inch OI |) | |
| LSE | EE ER | <i>1</i> -7 | AC | LY3 | fee | ER | (fee | /AT | ₹ 66 33 E4 | CASING DIAMETER: Not Applic | able | |
| Z Z | MP. | TIME | ADSPA (ppm) | G. | SPT s/0.5 | (%) (%) | H | VO. | STRATA (USCS) | SURFACE ELEVATION: Not Survey | red | |
| | SAMPLE NUMBER | T | HEADSPACE (ppm) | AB ANALYSI TPH-G (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ST. | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | | | E | LAB ANALYSIS TPH-G (ppm) | ē | 24 | Œ | GR | | SOIL DESCRIPTION | | |
| | | | | | 3 | 80 | | | Patient, | SAND - gray, moist, medium dense, non- | plastic. | |
| | 15-029 | 1555 | 183 | 13 | 3 | 100 | 21 | | SP | · poorly graded, slight petroleum odor and | stain | |
| | | <u> </u> | | | 1 5 | 100 | 22 | 60 | | | | |
| | | | <u>'</u> | _ | | | | 4/15/93 | | Silty CLAY - gray, wet, stiff, medium pla poorly graded, possible petroleum odor a | stic, nd stain | |
| | | | <u> </u> | | | | 23 | 4 | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | |
| Bentonite Chips | | | <u> </u> - | | | | 24 | V | | | | |
| | | | | - | | | 24 | | | | | |
| | | | | | | | 25 | | | | | ; |
| | 15-030 | 1605 | NS | NA | 5 | 0 | 90 | | CL | Silty CLAY - as above, no petroleum odo: stain | r and | |
| | 19-090 | 1009 | LVD | IVA | 6 | 100 | 26 | | | | | |
| 222777777 | | | | | | | 27 | | <u> </u> | | | |
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| | | | ! | _ | | <u> </u> | 28 | | | | | |
| | | | | | | | 29 | | | | | |
| | | | | | | | | | | Boring terminated at 25.0 feet - 4/15/93 Sampled to 26.5 feet | | |
| | | | <u> </u> | <u> </u> | | | 30 | | | Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /16/93 |
| | | | <u> </u> | | | | 31 | | | | | |
| | | | | <u> </u> | | | | | | Materials: 15 bags 3/4-inch Bentonite Chips | | İ |
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Page 2 of 2

File: B-7 2289

| HARIN & ASSOCIATES, INC. 43 NW Sixth Avenue Portland, Oregon (503) 796-0717 HAI LOGGE: Guy H. Tanz Guy H. Tanz SAMPLING METHOD: DRILLING METHOD: DRILLING METHOD: DRILLING METHOD: DRILLING METHOD: DRILLING METHOD: DRILLING METHOD: EQUIPMENT TYPE 2-inch ID Minuteman 1830 Date: Dring J. Sampling Contractors Time: | ### SOIL BORING NUMBER B-8 Portland, Oregon SOIL BORING NUMBER B-8 | SOIL BORING NUMBER B-8 Portland, Oregon (563) 798-0717 HAI LOGGER: Guy H. Tanz DRILL PROJECT: SAMPLING METHOD: 1.5/8-inch Split Spoon START FINISH Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID MINUTEMANY DRIL | SOIL BORING NUMBER B-8 Portland, Oregon (563) 798-0717 HAI LOGGER: Guy H. Tanz DRILL PROJECT: SAMPLING METHOD: 1.5/8-inch Split Spoon START FINISH Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 Portland, Oregon DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 1930 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID Minuteman 1830 PORTLAND OR COMPANY DRILLING METHOD: 2-inch ID MINUTEMANY DRIL | SOIL BORING NUMBER B-8 Portland, Oregon (508) 798-0717 HAI LOGGER: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH Time: 9030 NW 5t. Helens Road PORTLLING METHOD: 2-inch ID Hollow Stem Auger FROJECT #: PROJ | SOIL BORING NUMBER B-8 Fortland, Oregon Grand Congon Fortland, Oregon FORDIECT: Brix Maritime Company 9030 NW St. Helens Road FORDIECT #: 2289 DRILLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: 1830 1830 1830 1830 1830 1840 1850 1850 1850 1850 1850 1850 1850 185 | SOIL BORING NUMBER B-8 SOIL BORING NUMBER B-8 SOIL BORING NUMBER B-8 SOIL BORING NUMBER B-8 SOIL BORING NUMBER B-8 SOIL DESCRIPTION HAI LOGGER: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH BRILLING METHOD: 2-inch ID Hollow Stem Auger Time: T | SOIL BORING NUMBER B-8 Forland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL DRIL | Fortland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz PROJECT: SAMPLING METHOD: 1 5/8-inch Split Spoon Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon PROJECT #: 2289 DRILLING METHOD: 2-inch ID Hollow Stem Auger PROJECT #: 2289 DRILLING METHOD: 2-inch ID Minuteman Date: Date: Date: PROJECT #: 2289 DRILLING CONTRACTOR: Crisman Drilling DOTION DATE: | SOIL BORING NUMBER B-8 Portland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL DRILL PROJECT: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon DRILLER: R. Crisman Date: Da | A34 NW Sixth Avenue Portland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL DRILL PROJECT: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH DRILLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: Time: Time: Time: PROJECT #: 2289 DRILLING METHOD: 2-inch ID Minuteman Date: Date: Date: PROJECT #: 2289 DRILLING CONTRACTOR: Crisman Drilling BORING DIAMETER: S-inch OD CASING DIAMETER: SOIL DESCRIPTION CASING ELEVATION: Not Surveyed TOP OF CASING ELEVATION: Not Surveyed SOIL DESCRIPTION Concrete Silty GRAVEL with some Sand - Brown, moist, loose, non-plastic, poorly graded, no petroleum odor or stain (concrete fill) | Portland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL PROJECT: Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon DRILLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: PROJECT #: 2289 DRILLING CONTRACTOR: Crisman DRILLER: R. Crisman DRILLER: R. Crisman DRILLER: TANAL FINISH DRILLING CONTRACTOR: Crisman Drilling EQUIPMENT TYPE DRILLING CONTRACTOR: Crisman Drilling EQUIPMENT TYPE EQUIPMENT TYPE EQUIPMENT TYPE EQUIPMENT TYPE EXAMPLED A SOLUTION EXAMPLED A SOLUTI | Portland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL PROJECT: Brix Maritime Company 9030 NW St. Helens Road Portland, Oregon DRILLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: PROJECT #: 2289 DRILLING CONTRACTOR: Crisman DRILLER: R. Crisman DRILLER: R. Crisman DRILLER: TANAL FINISH DRILLING CONTRACTOR: Crisman Drilling EQUIPMENT TYPE DRILLING CONTRACTOR: Crisman Drilling EQUIPMENT TYPE EQUIPMENT TYPE EQUIPMENT TYPE EQUIPMENT TYPE EXAMPLED A SOLUTION EXAMPLED A SOLUTI | Portland, Oregon (503) 796-0717 HAI LOGGER: Guy H. Tanz DRILL PROJECT: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH Brix Maritime Company DRILLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: 9030 NW St. Helens Road EQUIPMENT TYPE 2-inch ID Minuteman 1830 1930 Portland, Oregon DRILLER: R. Crisman Drilling 15-Apr-93 15-Apr-93 ENERGY DRILLING CONTRACTOR: Crisman Drilling 15-Apr-93 15 | | | | | | | | | | | | | |
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| Portland, Oregon (502) 793-0717 HAI LOGGER: Guy H. Tanz PROJECT: SAMPLING METHOD: 1 5/8-inch Split Spoon START FINISH PROJECT: SAMPLING METHOD: 2-inch ID Hollow Stem Auger Time: Time: Time: 1830 Portland, Oregon PROJECT #: 2289 DRILLING CONTRACTOR: Crisman Date: Date: Date: Date: START FINISH PROJECT #: 2289 DRILLING METHOD: 2-inch ID Minuteman 1830 Date: Date: Date: Date: START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT #: 2889 GRID James Drilling START FINISH PROJECT Time: Time: Time: Time: Time: Time: Time: Time: Date: Date: Date: START FINISH PROJECT Time: Time: Time: Time: Time: Time: Time: Time: Time: Time: Date: Date: Date: START FINISH PROJECT Time: Tim | Portland, Oregon (502) 793-0717 HAI LOGGER: Guy H. 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| 25 | SAMPLE NUMBER | TIME | ADSPA (ppm) | 30 | SPT 7s/0.5 | 30V (%) | 밝 | | STRATA (USCS) | TOP OF CASING ELEVATION: Not Appli | | | | | | | | |
| ABANDONMEN'T DETAILS | S Z | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | M | TOP OF CASING ELEVATION: Not Appli | cable | | | | | | | |
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| | | <u></u> | | | 8 | 0 | | | SP | SAND - brown, moist, dense, non-plasti | c. poorly gra | ded | | | | | | |
| | 16-001 | 954 | 6.2 | NA. | 14 | 40 | 6 | | | no petroleum odor or stain | | | | | | | | |
| | | | | | 19 | 100 | | ĺ | | | | | | | | | | |
| | | | | <u> </u> | <u> </u> | | 7 | | | | | | | | | | | |
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| Bentonite Chips | <u> </u> | | | | <u>, </u> | <u> </u> | - 0 | | | | | | | | | | | |
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| | 70.000 | 100: | | \ | 13 | 20 | | | SP | SAND - as above, no petroleum odor or s | tain | | | | | | | |
| | 16-002 | 1004 | 4.8 | NA | 17 20 | 100 100 | 11 | | | | | 1 | | | | | | |
| | | | | | <u> 40</u> | 100 | 12 | | | | | 1 | | | | | | |
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| | · | | 1 | | 12 | 100 | 15 | | | SAND as above no noturious of a second | .toin | 1 | | | | | | |
| | 16-003 | 1019 | 6.7 | NA | 12 | 100 | 16 | | SP | SAND - as above, no petroleum odor or s | itam | ļ | | | | | | |
| | 10 000 | | <u> </u> | ~ 144 | 13 | 100 | | | 使多 式 | | | į | | | | | | |
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| entonite Chips | | | | | | | 18 | | \$ 9 .00 | | | • | | | | | | |
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| linille | | | | | | | 20 | - } | is a | | BRIX 00 | 1236 | | | | | | |

| HAHN | & ASS | OCIA | TES. | INC. | | | | | | | | | |
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| 434 NV | | | | | | | SO | IL. | BOR | NG NUMBER B - | 9 | | |
| Portlan | id, Oreg | on | | | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGE | R: | | | Jeff W. Doss | | DRILL | DRILL |
| PROJE | CT: | | | | SAMP | LING I | MET | HO) | D: | 2 5/8-inch OD Split Spoon | | START | FINISH |
| Brix M | | _ | • | |] | LING M | | |) <u>:</u> | 4 1/4-inch ID Hollow Stem Auger | | Time: | Time: |
| 9030 N | | | Road | | | PMEN | TYT 'I | Æ | | Canterra CT-250 | | 942 | 1035 |
| Portlar PROJE | | | | | DRIL | LER: LING C | ONTO | TD 4 | ОПОТ | M. Reniker | | Date: | Date: |
| | O1 #: | 2289 | | [ro | DKII | MAGO | ONT | | CTOR: | Geo-Tech Explorations, Inc. | nch OD | 16-Apr-93 | 16-Apr-93 |
| ABANDONMENT DETAILS | E 22 | | 뜅 | LAB ANALYSIS HCID (ppm) | eet) | RY | et) | GROUNDWATER | | | Applica | | |
| ATL | SAMPLE NUMBER | TIME | HEADSPACE (ppm) | ALYSI (ppm) | F 20 | RECOVERY (%) | DEPTH (feet) | W. | STRATA (USCS) | ······································ | Survey | | |
| DE L | AM UM | T. | Ą ġ | AB AN HCID | SPT ws/0.5 | 000 | H | E | TR. | TOP OF CASING ELEVATION: Not | | · | - |
| BAD I | ΩZ | | 田田 | H B | SPT (blows/0.5 feet) | RE | DE | EQ. | O ₁ O | | | | |
| <i>_</i> | | | | - | | | | 9 | Market & Market State (Market | SOIL DESCRI | PTION | | |
| | 16-004 | 1022 | 4.7 | ND | 9 | 20 100 | 21 | | SP | SAND - brown, moist to wet, den poorly graded, no petrloeum odor | se, non- | plastic, | |
| | 10 00 1 | 10 | | 1 2,2 | 8 | 100 | | | | poorly graded, no petrloeum odor | or stain | | |
| | | | | | | | 22 | | | | | | |
| | | | | - | | | 23 | | | | | | |
| | | | | | | | | | | | | | |
| • | | | | <u> </u> | | | 24 | | | Boring terminated at 20.0 feet - 4 | 1/16/93 | | |
| 1 | | <u> </u> | | | | | 25 | | | Sampled to 21.5 feet Boring abandoned with 3/4-inch | Bentoni | te Chips - 4 | V16/93 |
| | | | | | | | | | | | | | |
| | | | | <u> </u> | <u> </u> | <u> </u> | 26 | | | Materials: 10 bags 3/4-inch Bentonite Chips | | | |
| | | | | | | | 27 | | | | | | : |
| | | | | | <u> </u> | | 90 | | 1 | | | | |
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| LL | | | | | | ! | 10 | | | | E | 3RIX 00' | 1237 |

Page 2 of 2

File: B-9 2289

| HAHN | & ASS | OCIA | TES, | INC. | | | ··········· | | | | | | | | |
|------------------------|-----------|-------------|--------------------|--|-------------------------|--|--------------|----------------|--|---|-------|--|--|--|--|
| 434 NV | W Sixth . | Avenu | te | | | | SO | П | BOR | NG NUMBER B - 10 | | | | | |
| Portlar | ad, Oreg | on | | | | | _ | | | | | | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGE | R: | | | Jeff W. Doss DRILL DR | П.Т. | | | | |
| PROJE | ECT: | · , · . · · | | | SAME | LING | MET | HO | D: | 2 5/8-inch OD Split Spoon START FIN | | | | | |
| Brix M | [aritime | Comp | anv | | DRIL | LING M | ŒTI. | IOD | : | 4 1/4-inch ID Hollow Stem Auger Time: Time | | | | | |
| 1 | rw St. H | _ | • | | | PMEN' | | | | | 38 | | | | |
| | ad, Oreg | | | | DRIL | | | | | M. Reniker Date: Da | | | | | |
| PROJE | | 2289 | | | | LING C | ONT | RA | CTOR: | Geo-Tech Explorations, Inc. 16-Apr-93 16-Apr | | | | | |
| E | Ī | | <u> </u> | Ω | | Γ | | œ | · · | BORING DIAMETER: 10-inch OD | P1-30 | | | | |
| ABANDONMENT DETAILS | 61 64 | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | DEPTH (feet) | GROUNDWATER | | CASING DIAMETER: Not Applicable | | | | | |
| | LI H | 割 | E PA | 1 B | F. 5. | | E.E. | We | KT/ CS) | SURFACE ELEVATION: Not Surveyed | | | | | |
| | SAMPLE | TIME | ADSPA (ppm) | 30 | SPT 7s/0.5 | (%) | Į | | STRATA (USCS) | | | | | | |
| A A C | SE | _ | EA | AB ANALYS HCID (ppm) | low | RECOVERY (%) | 百 | 101 | S . | TOP OF CASING ELEVATION: Not Applicable | | | | | |
| | 1 | | T T | A C | <u>و</u> | - | | 8 | | SOIL DESCRIPTION | | | | | |
| Concrete | | | | | | | | | Asphait | Asphalt | | | | | |
| 田園田 | | | | <u> </u> | | | 1 | | | | | | | | |
| 世点曲 |] | | <u> </u> | | , | <u> </u> | 2 | | 00000000000000000000000000000000000000 | Silty GRAVEL with some Sand - brown/gray, moist, | | | | | |
| <i></i> | | <u> </u> |)· | - | ! | <u> </u> | 2 | 1 | | medium dense, non-plastic, slightly graded, no petroleum odor or stain | | | | | |
| | <u></u> | | | - | | | 3 | | | - | | | | | |
| | - | <u> </u> | <u> </u> | | i | | | 1 . | | | | | | | |
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| | 16-005 | 1055 | NS | NA | 9 50 | | | | | | | | | | |
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| ₩5₩ | | | | - | | | 10 | | | | | | | | |
| Bentonite Cl | - | | | _ | 1.0 | 20 | | | | SAND - as above, brown, no petroleum odor or stain | | | | | |
| | 16-006 | 1102 | 4.5 | NA | 13 | 100 | 11 | | SP | | | | | | |
| | | | | | 14 | 100 | | | | | | | | | |
| mille | | | | <u> </u> | 1 | | 12 | | | | | | | | |
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| | | | | | | | 15 | | | | | | | | |
| IIIIII | 70.555 | 4440 | 1.0 | 77. | 11 | 20 | 4.5 | | SP | SAND - as above, no petroleum odor or stain | | | | | |
| | 16-007 | 1110 | 4.9 | NA | 13 14 | 100 | 16 | | | | | | | | |
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| Milling. | | | | | • | <u></u> | 20 | 20 BRIX 001238 | | | | | | | |

| | & ASS | | • | INC. | | | ~~ | ~_ | ~~~ | | T) 10 | | |
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| 434 NV | V Sixth | Avenu | ıe | | | | SO | Ш | BOR | ING NUMBER | B - 10 | | |
| Portlar | ıd, Oreg | on | | | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HAI L | OGGE | R: | | | Jeff W. Doss | | DRILL | DRILL |
| PROJE | CT: | | | <u>-</u> : | SAMF | LING | MET | HOI | D: | 2 5/8-inch OD Split Spoon | | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ETE | (OD | ·: | 4 1/4-inch ID Hollow Stem Au | iger | Time: | Time: |
| Į. | W St. H | _ | - | | EQUI | PMEN | וציני יו | ЭE | | Canterra CT-250 | · | 1048 | 1138 |
| 1 | ıd, Oreg | | | | DRIL | | | | | M. Reniker | | Date: | Date: |
| PROJE | | 2289 | | | I | LING C | ŌNT | RAG | CTOR: | Geo-Tech Explorations, Inc. | | 16-Apr-93 | 16-Apr-93 |
| - | | | | r) | } | | | 7 | | BORING DIAMETER: | 10-inch OD | <u> </u> | 23-12p1-00 |
| HA. | കെ | | B | EST EST EST EST EST EST EST EST EST EST | eet | ₹ | et) | H | ا | CASING DIAMETER: | Not Applica | | |
| MH | | 图 | E PA | | T 5 | | [(fe | WA | E (S) | SURFACE ELEVATION: | | | · |
| DO | SAMPLE NUMBER | TIME | ADSPA (ppm) | ANALYSIS | SPT s/0.5 | 00 % 00 % | | 2 | STRATA (USCS) | | Not Survey | | |
| ABANDONMENT DETAILS | SE | | HEADSPACE (ppm) | AB ANALYSI HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 2 C | TOP OF CASING ELEVATION: | Not Applica | rpre | |
| AB | | | \#i | LAB | 9 | | H | EB EB | | SOIL DES | SCRIPTION | | |
| MHH | | | | | 10 | 50 | - | | general. | | | | |
| | 16-008 | 1118 | 5.1 | ND | 13 | 100 | 21 | | SP | SAND - brown/gray, moist t non-plastic, slightly graded stain | o wet, mediur | n dense, | |
| | | | | | 11 | 100 | | | | stain | , по рестоеси | 1 odor or | |
| } ' | | | | | <u> </u> | <u> </u> | 22 | | • | | | | |
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| | | | | | | 1 | | | | Boring terminated at 20.0 t Sampled to 21.5 feet | | | |
| <u> </u> | | | | | | 1 | 25 | | | Boring abandoned with 3/4 | -inch Bentoni | te Chips - 4 | 16/93 |
| | | | | | <u> </u> | | | | | | | | |
| İ | | | <u> </u> | | | - | 26 | | | Materials: 11 bags 3/4-inch Bentonite | Chips | | |
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| HAHN | & ASS | OCLA | TES, | INC. | <u> </u> | | | | | | | | |
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| 434 NV | W Sixth . | Avenu | ıe | | | | \mathbf{SC} | Π_{L} | BOR | ING NUMBER | B - 11 | | |
| ł | ıd, Oreg | | | | | | | | | | | | · |
| | 96-0717 | | | | | OGGE | | | | Jeff W. Doss | | DRILL | DRILL |
| PROJE | | | | | <u> </u> | LING | | | | 2 5/8-inch OD Split Spoon | | START | FINISH |
| 1 | aritime | - | _ | | | LING M | | | <u>:</u> | 4 1/4-inch ID Hollow Stem Aug | er | Time: | Time: |
| 1 | W St. H | | Road | | EQUI | PMEN' | ΓTY. | PE | | Canterra CT-250 | | 1150 | 1245 |
| | nd, Oreg | | | | DRILI | | | | ~~~ | M. Reniker | | Date: | Date: |
| PROJE | 5CT #: | 2289 | | _ | DRILI | LING C | LINOS | T | J'I'OR: | Geo-Tech Explorations, Inc. | | 16-Apr-93 | 16-Apr-93 |
| ABANDONMENT DETAILS | | | 舆 | LAB ANALYSIS HCID (ppm) | et. | ≻ . | 듔 | GROUNDWATER | ! | | l0-inch OD | | |
| MAN STI | TE SEE | 臼 | PAG | AT III | 1 2 g | E (| (fe | WA | TA (S) | | Not Applica | | |
| OTA | SAMPLE NUMBER | TIME | ADSPA (ppm) | A P | SPT s/0.5 | % % | H | 2 | STRATA (USCS) | | Not Survey | | |
| AN | SA | | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | no | 25 D | TOP OF CASING ELEVATION: 1 | Not Applica | ble | |
| | | | 田 | I.A. | 8 | | П | GR | <u> </u> | SOIL DESC | CRIPTION | | |
| Concrete | | | | | 1 | | 1 | | Asphalt | Asphalt | | | |
| 田 g 田 | | <u> </u> | <u> </u> | <u> </u> |] | <u> </u> | 1 | { ' | | | | | |
| #3# | | <u> </u> | | | | | 2 | | S GP | Silty GRAVEL with some San medium dense, non-plastic, sli | d - brown/gr ightly grade: | ay, moist, d. no | |
| | | | | | | | | 1 1 | | medium dense, non-plastic, sli petroleum odor or stain | | - | |
| | | | <u> </u> | <u> </u> | <u> </u> | | 3 | | | | | | |
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| | | | | | | | 5 | | | | | | |
| | | | | | 1 | 100 | | | SP | SAND - gray, moist, medium graded, no petroleum odor or | dense, non-p | olastic, poo | rly |
| | 16-009 | 1200 | 5.1 | NA | 9 | 20 | 6 | | | graded, no petroleum odor or | stain | | į |
| | | | | |) 9 | 20 | 7 | | | | | | : |
| | | | | <u> </u> | <u> </u> | - | - | | \$ G. J. | | | | |
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| Chips | | <u> </u> | | | <u> </u> | | 9 | | | | | | |
| | | | | | | - | 10 | | | | | | |
| onite | | | <u> </u> | i | 8 | 100 | | | SP | SAND - as above, gray, no pet | roleum odor | or stain | |
| | 16-010 | 1207 | 6.2 | NA | 10 | 100 | 11 | | | , , , , , , | | | : |
| | | | | | 10 | 100 | 10 | | | | | | |
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| | | | <u> </u> | | | | 15 | | | | | | |
| | | | <u>!</u> } | | 8 | 0 | | | | SAND - as above, possible pet | roleum odor | and | |
| | 16-011 | 1213 | 5.7 | ND | 8 | 20 | 16 | | SP | stain | | | |
| | | | | | 7 | 100 | | | | | | | |
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| HAHN | & ASS | OCIA | TES, | INC. | | | | | | | | |
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| 434 NW | V Sixth | Avenu | ıe | | | | SO | \mathbf{I} | BOR | ING NUMBER B - 11 | | |
| Portlan | d, Oreg | on | | | <u> </u> | | | | | | | |
| (503) 79 | 6-0717 | | | | HAI L | OGGE | R: | | | Jeff W. Doss | DRILL | DRILL |
| PROJE | CT: | | | | SAMP | LING | MET. | HOI | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix Ma | aritime | Comp | any | | DRIL | LING M | ŒŢĿ | IOD |): | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 9030 N | w St. H | elens | Road | | EQUI | PMEN' | r TY. | PE | | Canterra CT-250 | 1150 | 1245 |
| Portlan | d, Oreg | on | | | DRIL | LER: | | | | M. Reniker | Date: | Date: |
| PROJE | CT #: | 2289 | | | DRIL | LING C | INO | RA | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 |
| Ę | | | E E | Si | | | | 떮 | | BORING DIAMETER: 10-inch OD |) | |
| ESE I | SAMPLE NUMBER | E | HEADSPACE (ppm) | AB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | /AT | ₹6 | CASING DIAMETER: Not Applica | able | |
| | | TIME | ADSPA (ppm) | | SPT s/0.5 | (%) (%) | H H | 10 | SCS. | SURFACE ELEVATION: Not Survey | red | |
| NA NA | SAI | T | A G | 절등 | SWS | <u>S</u> | F | 5 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | able | |
| ABANDONMENT DETAILS | | | 田 | LAB HO |) jā | PE |] 🛱 | GROUNDWATER | | SOLL DESCRIPTION | | |
| | | | <u> </u> | - | 6 | 100 | | | 23(2) | SOIL DESCRIPTION | | |
| | 16-012 | 1219 | 4.4 | NA | 4 | 100 | 21 | | SP | SAND - gray, moist, medium dense, non- poorly graded, slight petroleum odor an | plastic, d stain | |
| | | | | | 5 | 100 | | 1 | | | | |
| | | | | <u> </u> | | | 22 | ₆₀ | | Silty CLAY - gray, moist, stiff, medium p poorly graded, no petroleum odor or stain | 1 | |
| | | | | - | <u> </u> | | 23 | 4/16/93 | | | | |
| | | |] | | | | 20 | 14 | | | | |
| | | | i | | | } | 24 | V | | | | |
| Bentonite Chips | | | | | | | | | | | | |
| | | | <u> </u> | <u> </u> | - 0 | | 25 | | | Silty CLAY - as above, wet, no petroleum | | |
| | 16-013 | 1227 | 4.8 | NA | 3 | 100 | 26 | | | stain | t odor or | |
| | 10-010 | 122, | 1 | 1122 | 4 | 100 | | | | | | |
| | | | | | | | 27 | | | | | |
| | | | | | | | | | | | | |
| 1 1 | | | <u> </u> | | | <u> </u> | 28 | | | | | |
| 1 1 | | | | - | - | - | 29 | | | | | |
| | | | | | | | | 1 | | Boring terminated at 25.0 feet - 4/16/93 | | |
|) [| | | | | | | 30 | | | Sampled to 26.5 feet Boring abandoned with 3/4-inch Bentoni | te Chips - 4 | /16/93 |
| 1 | | | ļ | <u> </u> | | | 0.7 | | | | - | |
| | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | 31 | | | Materials: | | |
| 1 } | | | | - | | <u></u> | 32 | | | 12 bags 3/4-inch Bentonite Chips | | |
| 1 1 | | | | | | | | 1 | | | | |
| | | | | | | | 33 | | | | | |
|]] | | | | | | | 24 | | | | | |
| 1 } | | | <u> </u> | <u> </u> | <u>.</u> | ! ! | 34 | | ' | | | |
| 1 | | | | | | | 35 | | | | | |
| | | | | 1 | | | | | | | | |
| | | | | | | | 36 | | | | | |
| 1 | | | | | [] | i | 97 | | | | | |
| | | | | | | <u> </u> | 37 | | | | | į |
| } | | | - | | | | 38 | | i | | | |
| } | | i | | | | | | | | | | |
| [| | | | | | <u> </u> | 39 | | | | | - |
|] } | | | | | | - - | 40 | | | , B | RIX 001 | 241 |

| HAHN 434 NW | I Sixth A | Avenu | | INC. | | | so | IL | BOR | NG NUMBER B - 12 | | |
|------------------------|------------------|---------------|--|----------------------------|-------------------------|-----------------|--------------|-------------|------------------|---|------------|-----------------|
| Portlan (503) 79 | _ | ac | | | TIATI | OGGEI | | | | Jeff W. Doss | DRILL | Dur- |
| PROJE | | | | | | LING I | | HU1 | | | START | DRILL |
| | aritime | Comp | Onw | | | ING M | | - | | | lime: | FINISH Time: |
| 9030 N | | - | • | | ļ | PMENT | | | ' <u>-</u> | Canterra CT-250 | 1304 | 1345 |
| 1 | | | noau | | DRILI | | 111 | - 111 | | M. Reniker | Date: | Date: |
| Portlan PROJE | | 2289 | | | | ING C | ONT | RA | CTOR: | | L6-Apr-93 | 16-Apr-93 |
| | 1 | | | SO | | | | т— | | BORING DIAMETER: 10-inch OD | <u> </u> | 10 11pt -00 |
| ABANDONMENT DETAILS | 69 EG | | HEADSPACE (ppm) | LAB ANALYSIS HCID (ppm) | SPT (blows/0.5 feet) | RY | DEPTH (feet) | GROUNDWATER | | CASING DIAMETER: Not Applicab | le le | |
| I KIN | SAMPLE NUMBER | Œ | E F | AB ANALYSI HCID (ppm) | T. | RECOVERY (%) | H (f | 7M(| STRATA (USCS) | SURFACE ELEVATION: Not Surveyed | | |
| | A M | TIME | ADSPA (ppm) | \$ B | SPT vs/0.5 | COV (%) | Y. | Z | 23 | TOP OF CASING ELEVATION: Not Applicab | | |
| NA I | SZ | _ | 自 | HCH | lov | RE | E E | 301 | §2 ∪ | 101 OF CASING ELEVATION. Not Applican | 16 | |
| | | | H-i | T | <u> </u> | | | 5 | A-bala | SOL DESCRIPTION | | |
| Concrete | | | | | | <u></u> | 1 | | Asphalt | Asphalt | | |
| 用a用 | | · | | | | | | | | Silty GRAVEL with some Sand - brown mo | ist medi: | |
| 馬ご用 | | | | | | | 2 | | GP 8 | Silty GRAVEL with some Sand - brown, mo dense, non-plastic, slightly graded, no petro stain | leum odo | ror |
| | | | [| | | | 3 | | | stam | | |
| | | | <u> </u> | <u> </u> | <u> </u> | | - 3 | } | | | | |
| | | | | | | | 4 | | | | | |
| | | | · | | | | |] | | | | |
| | | | <u> </u> | <u> </u> | <u> </u> | 90 | 5 | ļ | | | | |
| | 16-014 | 1310 | 4.8 | NA | 5 | 20 100 | 6 | | SP | SAND - gray, moist, loose, non-plastic, poor petroleum odor or stain | rly graded | l, no |
| | 10-01-4 | 1010 | 4.0 | 1477 | 5 | 100 | | 1 | | - | | |
| | | | | | | | _7 | 1 | | | | |
| | | | | | | | | | 1 | | | |
| | | - | <u> </u> | <u> </u> | | <u></u> | [8 | 1 | | | | |
| | | | | | <u></u> _ | | 9 | | Mary 4 | | | |
| lips squid | | | | | | | | | | | | |
| $m \circ m$ | | | | | | | 10 | 1 | | | | |
| Bentonite | 70.015 | 1017 | | BT A | 10 | 100 | 4- | | SP | SAND - as above, medium dense, possible p odor and stain | etroleum | |
| | 16-015 | 1317 | 7 | NA | 13 12 | 100 | 1 1 | | | odor and stain | | į |
| | | | | | 12 | 200 | 12 | | 4.764 | | | į |
| | | | | | | | | | | | | į |
| | | | | | | | 13 | | | | | |
| | | | | | | | 1.4 | | W/25/E-45 | · | | |
| | | | | <u> </u> | | <u> </u> | 14 | | | | | |
| | | | <u> </u> | | | | 15 | } | | | | |
| | i i | | | | 8 | 100 | | | SP | SAND - as above, slight petroleum odor and | l stain | |
| | 16-016 | 1325 | 7.1 | ND | 11 | 100 | 16 | | | • | | |
| (Lg []) | | | | | 13 | 100 | 17 | | | | | |
| Chips | | | <u></u> | | | | 11 | | | | | |
| | | | | | | | 18 | | | | | |
| MINITE Bentonite | | | | | | | 10 | | | | | |
| | | <u>-</u> | | <u> </u> | | <u>}</u> | 19 | | | | | |
| Willia | | | | | | | 20 | | | E | 3RIX 00 |)1242 |

Updated: 8/15/01 JWD Page 1 of 2 File: B-12 2289

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| į. | & ASS | | • | INC. | | | ~~ | | D | 7 7 | | - |
| 1 | V Sixth. | | ι e | | | | SO | IL. | BOR | ING NUMBER · B - 12 | | į |
| Portlar | ıd, Oreg | on | | | | | | | | | | |
| (503) 7 | 96-0717 | | - <u>-</u> | | HAI L | OGGE | R: | | | Jeff W. Doss | DRILL | DRILL |
| PROJE | CT: | | | | SAMI | LING | MET: | HO | D: | 2 5/8-inch OD Split Spoon | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ŒTH | IOD |): | 4 1/4-inch ID Hollow Stem Auger | Time: | Time: |
| 9030 M | W St. H | elens | Road | | EQUI | PMEN' | ľ TYI | PE_ | | Canterra CT-250 | 1304 | 1345 |
| | id, Oreg | on_ | | | DRIL | LER: | _ | | | M. Reniker | Date: | Date: |
| PROJE | CT #: | 2289 | | , | DRIL | LING C | ТЙO | RA | CTOR: | Geo-Tech Explorations, Inc. | 16-Apr-93 | 16-Apr-93 |
| Į. | | i | 屈 | E (| E | | 3 | EH | | BORING DIAMETER: 10-inch OI |) | |
| ES S | 田田田 | 6-7 | AC | ANALYSIS | fe | E E | fee | /AT | ₹.60 | CASING DIAMETER: Not Applie | able | |
| PAI | MB. | TIME | ADSPA (ppm) | | SPT s/0.5 | (%) (%) |) H | DA. | SCS | SURFACE ELEVATION: Not Survey | yed. | |
| | SAMPLE NUMBER | 11 | HEADSPACE (ppm) | AB ANALYS HCID (ppm) | SPT (blows/0.5 feet) | RECOVERY (%) | DEPTH (feet) | 5 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | - 2 | | 日 | LAB | Ē | A | 🛱 | GROUNDWATER | | COLL DESCRIPTION | | |
| minn | | | <u> </u> | | 1 | 100 | | <u> </u> | mm | SOIL DESCRIPTION | ! | |
| | 16-017 | 1333 | 5.3 | NA | 4 | 100 | 21 | | | Silty CLAY - gray/brown, moist to wet, s plastic, poorly graded, no hydrocarbon o | tiff, non- | |
| | | | | | 8 | 100 | |) | | plastic, poorly graded, no hydrocarbon oc stain | ior or | |
| | , | | | | ļ | | 22 | 1 | ! | | | |
| Į į | | | | | | | 23 | | ! | | | |
| 1 | | | <u> </u> | | ļ | | 20 | 1 1 | | | | |
| | | | | <u> </u> | | | 24 | | | Boring terminated at 20.0 feet - 4/16/93 | | |
|] | | | · | | | | | | | Sampled to 21.5 feet | | |
| 1 | | | 1 | | 1 | 1 | 25 |] | | Boring abandoned with 3/4-inch Benton | ite Chips - 4 | √16/93 |
| 1 | | | <u> </u> | | | | 26 | | | Materials: | | |
| | | | | | | | | | | 11 bags 3/4-inch Bentonite Chips | | ` |
| | | | | | | | 27 | | | | | |
| 1 | | | <u> </u> | <u> </u> | <u> </u> | | 28 | | i | | | j |
| | | | - | | - | - | 1 20 | | | | | |
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| 1 | | | <u> </u> | <u> </u> | ļ | <u></u> | 30 | | | | | 1 |
| | | | <u> </u> |) | i · | ! | 30 | | ' | | | |
| 1 | | - - | - | | } | | 31 | | | | | Į. |
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| | | | | | | | 32 | | | | | |
| | | | | <u> </u> | | | 33 | | i | | | 1 |
| [| | | | | <u> </u> | <u>' </u> | | | İ | | |] |
| | | | | | | | 34 | | ļ | | | j |
| | | | | | _i | | 35 | | | | | ļ |
| | | | <u> </u> | <u> </u> | <u> </u> | <u>' </u> | 30 | | | | | j |
| | | | | - | | | 36 | | | | | ł |
| } | | | | | | | | | | | | Į |
| | | | | | <u> </u> | <u> </u> | 37 | | | | | |
| [| | | | | | | 38 | | | | |] |
| | <u> </u> | | | | | | JU | | | | | Ì |
| | | | | | | | 39 | , | | . – - | = | |
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Updated: 8/15/01 JWD

Page 2 of 2

File: B-12 2289

| HAHN | & ASS | OCIA | TES. | INC. | Ī | | | | | · · · · · · · · · · · · · · · · · · · | | - |
|------------------------|------------------|--|--|---------------------------------------|-------------------------|--------------------|--------------|-------------|------------------|--|---------------|---------------|
| 1 | V Sixth | | - | _, | | | SC | Ш | BOR | ING NUMBER B-13 | | |
| Portlar | nd, Oreg | (on | | | | | | | | | | |
| | 96-0717 | | | | HAIL | OGGE | R: | | | Jeff W. Doss | DRILL | DRILL |
| PROJE | ECT: | | | | 4 | LING I | | HO | D: | 2 1/4-Inch OD Hand Auger | START | FINISH |
| Brix M | aritime | Comp | any | | DRIL | LING M | ŒT | IOL |); | 2 1/4-Inch OD Hand Auger | Time: | Time: |
| 9030 N | W St. H | Ielens | Road | | EQUI | PMEN' | r TY. | PE | | 2 1/4-Inch OD Hand Auger | 1345 | 1440 |
| Portlar | id, Oreg | on | | | DRIL | LER: | | | | Jeff W. Doss | Date: | Date: |
| PROJE | CT#: | 2289 | | | DRIL | LING C | INO | 'RA | CTOR: | Not Applicable | 16-Apr-93 | 16-Apr-93 |
| Ę. | | ļ | 덟 | E C | Ð. | | <u> </u> | 品 | | BORING DIAMETER: 2 1/4 Inches | 3 | |
| ESE | 留图 | 태 | AC. | LY. | fee | Y E | fee | ZAT | ₹2 | CASING DIAMETER: Not Applica | ble | |
| TAI | MA MA | TIME | ADSPA (ppm) | ANALYSIS .1M (ppm) | SPT s/0.5 | SAMPLE | H | E S | STRATA (USCS) | SURFACE ELEVATION: Not Survey | ed | |
| ABANDONMENT DETAILS | SAMPLE NUMBER | E | HEADSPACE (ppm) | AB ANALYSI 418.1M (ppm) | SPT (blows/0.5 feet) | SAMPLE INTERVAL | DEPTH (feet) | GROUNDWATER | | TOP OF CASING ELEVATION: Not Survey | ed | |
| AB/ | | | 臣 | LAB 418 | 3 | | 🛱 | E E | | SOIL DESCRIPTION | | |
| | | <u> </u> | <u> </u> |] | <u> </u> | [| <u> </u> | - | Asphalt | | ··· | |
| Concrete | | | | | | | 1 | | | | | • |
| # M | | | | | ļ. | | | | | | | |
| | | <u>!</u> | <u> </u> | | <u> </u> | | 2 | | 6 GP 8 | Silty CRAVETS - Brown moist loose no | a alostia | |
| | | <u></u> | | - | | | 3 | | | Silty GRAVELS - Brown, moist, loose, no moderately graded, possible fill | ı-piasuc, | |
| | | | | | | | | 1 | | | | |
| | | <u> </u> | ļ | | | 1 | 4 | | <i></i> | | | į |
| Bentonite Chips | | | • | | | | 5 | | | | | |
| | 16-018 | 1402 | 4.5 | NA | | | | | CI. | Silty CLAY - gray, moist to wet, stiff, non graded, no petroleum odor or stain, sheen | -plastic, po | orly |
| | | | | | | | 6 | | | bit | г помсей оп | auger |
| Sent Sent | | | | | - | | 7 | | | | | |
| | | | <u> </u> | | <u> </u> | | <u>'</u> | 1 | | | | |
| | 16-019 | 1415 | 6 | NA | | | 8 | | | | | |
| | | <u> </u> | | | | | | | | | | |
| | | | <u>;</u> | <u> </u> | <u> </u> | | 9 | | SM | Silty SAND - gray, moist, loose, non-plast graded, no petroleum odor or stain, sheen | ic, poorly | on. |
| | | | | | | | 10 | | | auger bit | . Sull exists | |
| | | | | | | | | | | | | |
| | 16-020 | 1435 | 10.3 | 200 | | - | 11 | | | | | |
| 1 | | | | | | | 12 | | | | | İ |
| | | | | | | | | | | Boring terminated at 11.0 feet - 4/16/93 Sampled to 11.0 feet | | |
| | | | | | | | 13 | | | Boring abandoned with 3/4-inch Bentoni | te Chips-4 | /16/93 |
| | | | | | | - | 14 | | | ar () 1. | | Į |
| | | | | | <u> </u> | - ! | 14 | | | Materials: 3/4 bags 3/4-inch Bentonite Chips | | |
| | | | | | | | 15 | | | - | | İ |
| | | | | - | | | | | | | | 1 |
| | | j | | | | | 16 | | | | | |
| | <u> </u> | | | · · · · · · · · · · · · · · · · · · · | | | 17 | | | | | |
| | | <u>-</u> | | <u>:</u> | | | -77 | | | | | ł |
| | | • | | | | | 18 | | | | | ļ |
| - | - | | | | | | 19 | - | | | | |
| | <u>:</u> | <u> </u> | <u> </u> | <u> </u> | | <u>!</u> | 19 | | | | = | 1 |
| | | | | | | | 20 | | | | BRIX 0 | 1244 |

| | & ASS | | | INC. | Ţ | | | ~~ | · · · | | |
|---|-------------------|--------------|--------------------|---|-----------|----------|-----------------|--------------|------------|------------------|---|
| 434 NV | W Sixth. | Avenu | е | | | | | SC |)11 | 4 BO | RING/PROBE NUMBER B-14 |
| Portlar | nd, Oreg | on | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HA | IL | OGGE | R: | | | Jason M. Greifer DRILL DRILL |
| PROJE | ECT: | | | | SA | MP | LING I | MET | HOI | D: | 4' Continous Core START FINISH |
| Bri | ix Marit | ime Co | mpan | У | DR | Ш | JING M | ŒTE | IOD | : | Direct Push Time: Time: |
| 908 | 30 NW S | t. Hel | ens Ro | ad | EQ | UU | PMEN | r TY. | PE | | Geoprobe 7:43 15:40 |
| Por | rtland, C |)regon | | | DR | ші | ER: | | | | Marcus Johnson Date: Date: |
| PROJE | | | 5074 | | DR | Ш | ING C | ONI | 'RA | CTOR: | Geo Tech Explorations, Inc. 29-May-01 29-May-01 |
| E | | | r.a | E. | | | | | IR IR | | BORING DIAMETER: 2" |
| A SE | E # | <u> </u> | | 马鱼 | F | AĽ. | RY | eet | ATI | A (| CASING DIAMETER: Not Applicable |
| ALL | IZE I | TIME | ADSPA (ppm) | 图明 | SS | RV. | OVE (%) | J) H |)W | AT | SURFACE ELEVATION: Not Surveyed |
| ABANDONMENT DETAILS | SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT TPH (ppm) | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | ROUNDWATER | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applicable |
| A A | N Z | ļ | 臣 | A E | ö | Z | RE | 層 |]S | Ω) | TOT OF CEDARC DESCRIPTION, TROUBPRICABLE |
| | } | | 144 | - |] | | | | [⊡ | | SOIL DESCRIPTION |
| Asphalt | | | | | | | 100 | | | Asphalt | , · |
| | 3 | <u> </u> | | | | _ | 100 | 1 1 | | GW | a · , , , , , , , , , , , , , , , , , , |
| | } | | | ļ | | | 100 | 2 | | | non-plastic,no petroleum odor, sheen, or discoloration |
| | } | <u> </u> | <u> </u> | <u> </u> | - | | 100 | | | SM | SAND with trace Silt - light gray, dry, medium dense, |
| | } | | | | | | 100 | 3 | | | slightly graded, medium grained, non-plastic, no |
| | - |) | | | | | 100 |] | 1 | | petroleum odor, sheen, or discoloration |
| | 084 | 7:47 | 36.5 | - | | | 100 | 4 | | (240) W | |
| | } | | ļ <u></u> | | | | 100 | 5 | | SP | SAND - light brown, dry, medium dense, medium |
| | } | <u>!</u> | <u> </u> | <u> </u> | | | 100 | (0 | | or Table | grained, poorly graded, non-plastic, no petroleum odor, |
| | } | | | | \vdash | | 100 | 6 | | | sheen, or discoloration |
| | } | | | <u>'</u> | | | 100 | | 1 | | |
| | 3 | | | | | | 100 | 7 | 1 | a dive | |
| | 3 | | | | | | 100 | } |]] | | SAND - as above, no petroleum odor, sheen, or |
| Giillii | 085 | 7:56 | 11.2 | <u> - </u> | | | 100 | 8 | | SP | discoloration |
| [] <u>B</u> | <u>}</u> | | | | | | 100 100 | 9 | | \$ 10 | |
| () 5 ()) | } - | <u> </u> | | <u> </u> | ╌┤ | | 100 | 3 | 1 | Br. S | |
| | } | | | | | | 100 | 10 | | SM : | SAND with trace Silt - light gray, dry, medium dense, |
| | | | | | | ļ | 100 | | | 内容是便 | medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration |
| | 3 | | | | | | 100 | 11 | | | |
| $\mathbb{Z}_{\operatorname{g}}\mathbb{Z}$ | | | 0.1.0 | | | | 100 | | | SP | SAND - light brown, dry, medium dense, medium |
| | 086 | 8:04 | 24.9 | | | | 100 | 12 | | AT MA | grained, poorly graded, non-plastic, no petroleum odor, |
| | } | | | | | | 100 | 13 | | 學被逐 | sheen, or discoloration |
| IIIIIIA | - | | | <u> </u> | \vdash | | 100 | 10 | 1 1 | | |
| | } | | | | - | | 100 | 14 | | 高兴湖 | |
| | | | | | | | 100 | | | | |
| IIIIII | | | | | | | 100 | 15 | | | |
| | | | | | | _ | 100 | ! | | SP | SAND - as above, no petroleum odor, sheen, or |
| | 087 | 8:14 | 19.2 | | * | <u> </u> | 100 | 16 | | or The state | discoloration |
| | - | | | | | - | 100 | 17 | | | |
| | | <u>-</u> | ! | | - | | 100 | 7.1 | | | |
| | | | | | + | \dashv | 100 | 18 | | n en | |
| | | i | | | | _ | 100 | | | | |
| | | | | | | | 100 | 19 | | | SAND - as above, no petroleum odor, sheen, or |
| | | | | | | | 100 | | | SP | discoloration |
| | 088 | 8:23 | 6.1 | - | | , { | 100 | 20 | 1 | の理論が | BRIX 001245 |
| | | | | | | | | | | | |

| HAHN | & ASS | OCIA | TES. | INC. | <u> </u> | | | | | | | |
|------------------------|---|--------------|--------------------|-------------------------|--|--|--------------|---------------|------------------|---|------------------------|--------------------|
| | V Sixth | | | | | | SC | \mathbf{II} | L BO | RING/PROBE NUMBER | $\mathbf{B}\text{-}14$ | |
| | ıd, Oreg | | | | | | | | | | | |
| | 96-0717 | | | | HATT | OGGE | ₽ . | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | - | PLING | | HO | D. | 4' Continous Core | START | FINISH |
| 1 | x Mariti | ima C | mnan | 77 | | LING M | | | | Direct Push | Time: | Time: |
| | O NW S | | | - | | PMEN | | | · | Geoprobe | 7:43 | ! |
| 1 | | | | au | | | 1 1 1. | F <u>F</u> | | | | 15:40 |
| PROJE | tland, C | regon | 5074 | | DRIL | LER: LING C | דערי | א פוי | CTOR: | Marcus Johnson Geo Tech Explorations, Inc. | Date: | Date: 29-May-01 |
| } | <u>Ο . </u> | | 2012 | _ | Ditti | T | OIVI | T | 1 | BORING DIAMETER: 2" | 23-May-01 | 29-May-0] |
| NE | *. | | 됨 | [<u>[</u>] | | Σ | (F) | 圄 | | | | |
| NM | 温度 | 图 | PA(E | ls: Id | SP SP | 色 | (fe | WA | E SS | | | |
| DO! | | TIME | ADSPA (ppm) | AB RESUL TPH (ppm) | CORE/SPT INTERVAL | 00 00 00 00 00 00 00 00 00 00 00 00 00 | T. | 图 | STRATA (USCS) | SURFACE ELEVATION: Not Surve | | |
| ABANDONMENT DETAILS | SAMPLE NUMBER* | ` ' | HEADSPACE (ppm) | LAB RESULT TPH (ppm) | 용돌 | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 22.0 | TOP OF CASING ELEVATION: Not Appli | caple | |
| \ \P | |] | Œ | 1.7 | | - | - | 125 | | SOIL DESCRIPTION | N | |
| | | | | | | 100 | | | TO THE | | | |
| | | | | | | 100 | 21 | .[| | | | |
| | | <u> </u> | <u> </u> | | <u> </u> | 100 | | | 2 | SAND - light brown, dry, medium dense | | |
| | | <u> </u> | <u> </u> | - | - | 100 | 22 | 4 | SP | grained, poorly graded, non-plastic, no | | dor. |
| | 089 | 8:32 | 12 | _ | | 100 | 23 | | | sheen, or discoloration | | , |
| | | | | | | 100 | | 1 | CL | CHILL COT ATT II I | | |
| Chips | | | | | \ \\ | 100 | 24 | | | Silty CLAY - light gray, moist, medium plastic, no petroleum odor, sheen, or dis | | ly |
| | | | · - | | | 100 | 25 | | | | COTOLAMOL | |
| | | | | <u></u> - | - | 100 | | | | | | |
| Bentonite | | | | - | | 100 | 26 | | | | | |
| | | | | | | 100 | | | | | | |
| 8-inch | | <u> </u> | <u> </u> | | | 100 | 27 | | | | | |
| 111,511 | 090 | 8:50 | 3.2 | | | 100 | 28 | | CL | Silty CLAY - as above, no petroleum od | or, sheen, o | r |
| | | | 1 | - | | 100 | | | | discoloration | | |
| | | | | | | 100 | 29 | 5 | | | | |
| | | ļ | | | - | 100 | 30 | 62/6 | | ATTEMPTED GROUNDWATER SAMI | भ.स | |
| | | <u> </u> | <u> </u> | <u>j</u> I | <u> </u> | 100 | 1 30 | | | Installed a temporary 1-inch ID stainles | | I |
| | | | | <u> </u> | | 100 | 31 | | | point with a 0.010-inch slotted screen at | | et |
| | | <u> </u> | | <u> </u> | | 100 | | | | bgs. No water was encountered. Well p | oint was | |
| | | | | | V | 100 | 32 | Þέ | | removed and boring continued. | | |
| Ì | <u> </u> | | | | | ļ | 200 | | | | | |
| | | <u> </u> | | <u> </u> | | | 33 | ł | | GROUNDWATER SAMPLE | | - |
| 1 | | ļ | | | | <u> </u> | 34 | | | Installed a temporary 1-inch ID stainle point with a 0.010-inch slotted screen a | | |
| | | | | | <u></u> | | <u> </u> | 1 | | bgs. No water was initially encountere | | |
| | | | | | | | 35 | | | hours of recharge, groundwater sample | | |
| 1 | | Ĺ | | | | Ţ | | | | 108) was collected with a vacuum pum | | |
| 1 | - | | | <u> </u> | | 1 | 36 | | | tubing/check valve at 15:39 hours, 05/2 | | point |
| | | <u> </u> | | | | | 37 | | | was removed and the boring was aband | OHEA. | |
| | | | | | | | 31 | | | | | |
| | | | | _ | | | 38 | | | Boring terminated at 32 feet bgs | | |
| | | | | | | | | | | Sampled to 28 feet bgs | | |
| | | | | | | <u> </u> | 39 | | | Boring abandoned with 3/4-inch Bento | mte Omps | - |
| | | | | <u> </u> | | <u> </u> | 40 | | | | DO VIGG | 1246 |

| Fortland, Oregon SAMPLING METHOD: SAMPLING METHOD: Oregon START PINISH PROJECT: SAMPLING METHOD: Oregon Orego | HAHN 434 NW | Sixth . | Avenu | | INC. | | | so |)II | - BO | RING/PROBE NUMBER B-15 |
|--|--------------------|-----------------|--|-----------|--|--------------|--|---------------|-----|-----------|--|
| PROJECT: SAMPLING METHOD: 4' Continous Core | | | | | | | | | | | |
| Brix Maritime Company 9680 NW St. Helena Road POULLING METHOD: Direct Fush Time: Time: Time: Data | | | | | | 1 | | | | | DIMILITY OF THE PROPERTY OF TH |
| 9030 NW St. Helens Road | Į – | | | | | | | | | | |
| Partiand, Oregon | 1 | | | - ' | - | | | | |): | |
| PROJECT #: 6074 DRILLING CONTRACTOR: Geo Tech Explorations, Inc. 29-May-01 29-May- | | | | | ad | EQU | ЛРМЕЙ' | Т ТҮ. | PE | | |
| BORING DIAMETER: 2º CASING DIAMETER: 3CASING DIAMETER: 3CASING | | | regon | | | | | | | | |
| Asphalt 100 10 | | CT #: | | 5074 | · | DRI | LLING | CONT | 'RA | CTOR: | |
| Asphalt 100 10 | LNI | | | 臼 | 5 | _ | , | | ER | | BORING DIAMETER: 2" |
| Asphalt 100 10 | LS | 强民 | E-3 | AC) | | TY. | EK E | fee | /AT | ¥ 66 | CASING DIAMETER: Not Applicable |
| Asphalt 100 10 | AI | (A) | × | PSP md | A O | A P | \$ S F | H) | | SCA | SURFACE ELEVATION: Not Surveyed |
| Asphalt 100 10 | | A L | | Ϋ́ P | H.H. | la E | | F | 15 | | TOP OF CASING ELEVATION: Not Applicable |
| Asphalt 100 10 | ABA | ^ω Z | | HI | | ပြင် | | DE | GRO | J. | SOIL DESCRIPTION |
| GRAVEL with some Sand - light brown, dry, medium dense, poorly graded, coarse grained, non-plastic, no petroleum odor, sheen, or discoloration SAND with some Silt - light brown, dry, medium dense, poorly graded, coarse grained, non-plastic, no petroleum odor, sheen, or discoloration SAND with some Silt - light gray, dry, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration | <u> </u> | |]] | |] | | 100 | | | Asphalt | |
| 100 2 100 3 100 3 100 3 100 3 100 4 100 5 100 | | | | | | | 100 | 1 | | ĝ GW ; | GRAVEL with some Sand - light brown, dry, medium |
| 100 | | | | | | | |] _ | | | |
| 100 3 100 4 100 4 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 | | | ļ | | <u> </u> | + | | $\frac{1}{1}$ | 4 | | |
| SAND with some Silt - light gray, dry, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration | | | ļ | | | ┼╌┼ | | - 3 | | 1.5 | |
| 100 | | | <u> </u> | | <u> </u> | | | | | - | SAND with some Silt - light gray dry medium |
| 100 100 5 100 6 100 6 100 7 100 7 100 10 | | 091 | 9:30 | 0.8 | | 1 | 100 | 4 | | SM | |
| 100 6 100 6 100 7 100 7 100 8 100 9 100 | | | | <u> </u> | | _ | | _ ا | | | |
| 100 6 100 7 100 7 100 8 100 7 100 8 100 9 100 | | | <u> </u> | | <u> </u> | | | 5 | 4 | | |
| 100 | | | | | | | | <u>ا</u> ۾ | | | |
| 100 7 100 8 100 10 100 10 100 10 1 | | | <u>. </u> | ` | | | | | 1 | CUIT | |
| SAND - light brown, moist, medium dense, medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration SP | | | | | | | 100 | 7 | 1 | | |
| 100 | | | 0.05 | | | | | _ | | | no performanci, sheer, or inscoloration |
| 100 9 100 10 100 10 100 10 1 | | 092 | 9:37 | 1.5 | <u> </u> | + | | 8 | | SP T | |
| 100 100 100 100 1100 1100 1100 1100 1100 1100 1200 1300 1400 1400 1500 1000 1400 1500 1600 1600 1600 1600 1600 1700 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 1000 1800 | | | | | | | | 9 | | | |
| GRAVEL with some Sand - light brown, moist, medium dense, slightly graded, medium grained, non-plastic, no petroleum odor, sheen, or discoloration 100 | 85 W | | | | | | | j | | 望生 | smooth, or discontration |
| 100 | | | | | | | | 10 | 1 | | GRAVEL with some Sand - light brown, moist. |
| 100 | @# | | | | ļ | - | | | | A CVIII | medium dense, slightly graded, medium grained, non- |
| 100 13 100 14 100 15 100 15 100 15 100 15 100 16 100 17 100 18 100 19 100 19 100 19 100 19 100 19 100 19 100 100 19 100 100 19 100 100 19 100 | M P. B | | | | | - | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 1 <u>11</u> | | y GW 8 | plastic, no petroleum odor, sheen, or discoloration |
| SAND - light brown, moist, medium dense, medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration 100 | | 093 | 9:44 | 2.0 | - | 1 | | 12 | | QD . | |
| 100 14 100 15 100 15 100 16 100 17 100 18 100 | (() % ()] | | | | <u> </u> | | | | | | |
| 100 14 100 15 100 15 100 16 100 17 100 18 100 19 100 19 100 19 100 | Ward 1 | | | | | | | 13 | | | |
| 100 | | | | | | | | | | | sneen, or discoloration |
| 100 15 100 16 SP SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum o | | | | | <u> </u> | } | | 14 | } } | | |
| 100 | | | | | | - | | 15 | | | |
| 094 10:00 2.1 - ▼ 100 16 | WIIII) | | | _ | | \vdash | | 1.0 | | | (|
| 100 17 100 18 100 19 SAND - as above, no petroleum odor, sheen, or discoloration | | 094 | 10:00 | 2.1 | | + | | 16 | | | |
| 100 18 100 19 SAND - as above, no petroleum odor, sheen, or discoloration SP SP SP SP SP SP SP S | | | | | | | | | | | · UISCULOTATION |
| 100 18 100 19 SAND - as above, no petroleum odor, sheen, or discoloration SP SP SP SP SP SP SP S | | | | | | | | 17 | | | |
| SAND - as above, no petroleum odor, sheen, or discoloration | | | | | | | | | | | |
| SAND - as above, no petroleum odor, sheen, or discoloration | | | | | | - | | 18 | | | |
| discoloration | | | 1 | | | - | | 10 | | | SAND - as above, no petroleum odor, sheen, or |
| 005 10.11 1 0 100 90 | | | i | | | \dashv | | | | SP | |
| | | 095 | 10:11 | 1.6 | | | | 20 | | ÷ | BRIX 001247 |

| | 0 A CC | O CT I | - | | | | | | | | | |
|--|-------------------|-------------|--------------------|--|--|--|--------------|-------------|--|--|--|-----------------|
| HAHN | & ASS Sixth A | | | INC. | | | SC |) | · BO | RING/PROBE NUMBER | B-15 | |
| 1 | | | . U | | | | J | <i>,</i> | a DU. | CHINGE HODE HOMBELL | 77-TO | |
| Portlan (503) 79 | | 010 | | | TYAT | LOGGE | D. | | | Jason M. Greifer | DRILL | |
| PROJE | | | | · | + | PLING | | <u>-</u> | | 4' Continous Core | START | DRILL |
| | x Mariti | ma Cr | | | | LLING I | | | | | Time: | FINISH Time: |
| | 0 NW S | | - | - | \vdash | TPMEN' | | | <u>, </u> | Geoprobe | 9:25 | 1 |
| 1 | tland, C | | | au | - | LLER: | 4 4 1. | F 151 | | | Date: | 11:23 Date: |
| PROJE | | Tegon | 5074 | | | LLING C | rvos | RA | CTOR: | | Date: 29-May-01 | |
| 1 | | | | | 1 | | 1 | | | BORING DIAMETER: 2" | | |
| E S | 田 选 | ı | 딍 | 是鱼 | 5. ₹ | 3 X | DEPTH (feet) | ATE | 4. | CASING DIAMETER: Not Applical | ble | |
| AIL | PL | TIME | (ppm) | ESI (d) | S | (多) (多) | J) H | W. | AT. | SURFACE ELEVATION: Not Surveye | | |
| | SAMPLE NUMBER* | TI | \$ B | AB RESUL TPH (ppm) | CORE/SPT | RECOVERY (%) | E | INS. | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applical | | |
| ABANDONMENT DETAILS | 2 2 | | HEADSPACE (ppm) | LAB RESULT TPH (ppm) | ဝိ 🛭 | | DE | GROUNDWATER | W ₁ · | | | |
| 4 | | | | | <u> </u> | | | Ö | | SOIL DESCRIPTION | | |
| | | | <u> </u> | | - | 100 | 21 | | SP | SAND - light brown, moist medium dense, | medium | |
| | | | | | + | 100 | 21 | 1 | | grained, poorly graded, non-plastic, no pet | | |
| 3/8-inch Bentonite Chips | | | | | 1 | 100 | 22 | | 100 | sheen, or discoloration | | i |
| | | | | | | 100 | | | | | | |
| ()()()()()()()()()()()()()()()()()()() | | - | 1 | | 1 | 100 | 23 | 5/29/01 | | | | |
| | 096 | 10:23 | 1.4 | - | ↓ | 100 | 24 | 5 | SP | SAND - as above, no petroleum odor, shee | n. or | |
| | | | | | | 100 | | | or : | discoloration | , | |
| % | 097 | 10:36 | 2.4 | - | 1 | 100 | 25 | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |
| | | <u> </u> | <u> </u> | | 1-1 | 100 | 26 | | | | | |
| | | | <u> </u> | | † † | 100 | | \$4 | | Cille CT A37 liels are reighted at alif | ר. היים יותר מיים. מרוב ליים ויותר מיים | _ |
| | | | | | | 100 | 27 | | CL | Silty CLAY - light gray, moist to wet, stift plastic, no petroleum odor, sheen, or disco | | y |
| | 098 | 10:37 | 0.6 | | 1 | 100 | 28 | | | l | 201000 | |
| | 300 | 20.5 | 0.0 | | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 100 | | | | | | |
| | | | | | | | 29 | | | GROUNDWATER SAMPLE Installed a temporary 1-inch ID stainless | ctool wall | |
| 1 | | | | | | | 200 | | | point with a 0.010-inch slotted screen at 2 | | |
| 1 | | | | <u> </u> | <u>!</u> | - | 30 |] | 1 | bgs. Following the removal of approximat | | |
| 1 1 | | | | | | + | 31 | | | water the well point was purged dry, after groundwater samples (#5074-010529-104) | | |
| | | | | | | | | | | 010529-105) were collected with a vacuum | | |
| | | | | <u> </u> | <u> </u> | | 32 | | | disposable tubing/check valve at 11:14 and | 111:15 | |
| } | | | | | | | 33 | | | hours, respectively, 05/29/01. After sampli | | elI |
| } { | | | | | | | | | | point was removed and the boring was aba | апаолеа. | Į |
| | | | | | | | 34 | | | | | j |
| į į | | | <u> </u> | | | | ~~ | | | | |] |
| | <u>'</u> | | | | <u>i </u> | <u>i</u> | 35 | | | Boring terminated at 28 feet bgs | | } |
| 1 | | | | | | | 36 | | | Sampled to 28 feet bgs Boring abandoned with 3/4-inch Bentonit | e Chins | |
| [| | | | | | | | | | | | |
| l (| | | | | | | 37 | | | | |] |
| 1 | | | | | | | | | | • | | |
| 1 | | | | | | | 38 | | | | | { |
| } | | | | | | | 39 | | | | | ļ |
| | | | | | | | | | | Di | DIV AA4 | 240 |
| 1 [| - 1 | Ī | | | i | - | 40 | . [| | Ы | RIX 001 | 44ŏ |

| HAHN 434 NV | | | • | INC. | | | | so | | L BO | RING/PROBE NUMBER | B-16 | |
|------------------------|-------------------|--------------|--------------------|--|----------|----------|-----------------|--------------|-------------|------------------|---|-----------|-------------|
| Portlan | ıd, Oreg | тор | | | | | | | | | | | |
| (503) 7 | 96-0717 | · | | | HA | ΙL | OGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | _ | ··· | | SA | MΡ | LING I | MET: | но | D: | 4' Continous Core | START | FINISH |
| Bri | x Marit | ime Co | ompan | y | DR | ILI | ING M | ŒTI | IOI |): | Direct Push | Time: | Time: |
| 903 | 0 NW S | t. Hel | ens Ro | ad | EQ | ווט | PMEN | TY. | PE | | Geoprobe | 9:25 | 11:23 |
| Por | tland, (| Oregon | L | | DR | ILI | ER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | | | 5074 | | DR | Ш | ING C | INO | RA | CTOR: | Geo Tech Explorations, Inc. | 29-May-01 | 29-May-01 |
| T. | | | ran | 11 | | | | | S.R. | | BORING DIAMETER: 2" | · | |
| ABANDONMENT DETAILS | 田珠 | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | F | AI. | RY | DEPTH (feet) | GROUNDWATER | 4 | CASING DIAMETER: Not Applic | able | |
| AIL | SAMPLE NUMBER* | TIME | (ppm) | E T X | S | RV | RECOVERY (%) | H (f | DW. | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| | ₹ <u>₹</u> | II | B E | E C C | E | 田 | <i>ရ</i>) လ | | E | | TOP OF CASING ELEVATION: Not Applica | | |
| Ago ! | N E | • | 開 | | ಶ | Z | RE | 图 | 12 | ω) | Tot of ormand many march. Thousand | | |
| [V | | | | Ţ | | | | | 9 | | SOIL DESCRIPTION | | |
| Asphalt | | | | | | | 100 | _ | | Asphalt | Asphalt | | |
| | | <u> </u> | | | - | | 100 | 1 | - | sw∜ | Gravely SAND with some Silt - light gray | | |
| | | - | ! | <u> </u> | | | 100 | 2 | | - 3 | medium dense, poorly graded, medium gr | | a- |
| | | | <u></u> | i i | | | 100 | | 1 | 源 | plastic, no petroleum odor, sheen, or disc | otoration | |
| | | | | | | | 100 | 3 | | 1 | | | |
| | | ! | | ļ | | | 100 | | 1 | 11100 | | | |
| | 099 | 11:35 | 3.2 | - | | | 100 100 | 4 | | SW * | Gravely SAND with some Silt - as above | , no | |
| | | | <u> </u> | | \vdash | | 100 | 5 | ;] | | petroleum odor, sheen, or discoloration | | |
| | | | · | | | | 100 | | 1 | | | | |
| | | | | | | | 100 | 6 | | 北州港 | | | |
| | | | ļ | ļ | | | 100 | _ | | E | | | |
| | | | <u> </u> | <u> </u> | | | 100 | 7 | 1 | SP | SAND - light brown, moist, medium dens | e, mediun | 1 . |
| | 201 | 11:37 | 4.2 | - | | , | 100 | 8 | | | grained, poorly graded, non-plastic, no pe | | |
| | | | | | | | 100 | | 1 | | odor, sheen, or discoloration | | |
| Chips | | | | | | | 100 | 9 | | | | | |
| | | <u> </u> | | <u> </u> | | | 100 | 7.0 |] | 40.00 | <u>.</u> | | |
| entonite | | 1 | | 1 | | _ | 100 | 10 | 7 | SM | Silty SAND - light gray, moist, medium o | lense, | |
| | | | | - | | - | 100 | 11 | | 1900 N | medium grained, slightly graded, non-pla petroleum odor, sheen, or discoloration | astic, no | |
| nch B | | | | <u> </u> | | - | 100 | | 1 | | pen oleuni odor, sneen, or discoloration | | į |
| 8 ⁶ -in | 202 | 11:40 | 6.0 | ND | | 7 | 100 | 12 | | SP | SAND - light brown, moist, medium dens | e. mediun | ı İ |
| $0 \circ 0$ | | | | <u> </u> | | 4 | 100 | | | | grained, poorly graded, non-plastic, no pe | | |
| | | | | | | | 100 100 | 13 | 1 | | odor, sheen, or discoloration | | : |
| | | | | | | | 100 | 14 | | | | | |
| | | | | | | - | 100 | | | | | | |
| | | | | | | | 100 | 15 | | | | | 1 |
| | | | | | | | 100 | | | 45 | | | Į. |
| | 203 | 11:44 | 7.7 | | \ | _ | 100 | 16 | | SP | SAND - as above, no petroleum odor, she | en or | |
| | | | | | | _ | 100 | 17 | | or i | discoloration | , | ļ |
| | | | | | | \dashv | 100 | 17 | | | | | |
| | | | | | -+ | + | 100 | 18 | | | | | } |
| | | | | | | | 100 | | | | | | 1 |
| | | | | | \Box | 1 | 100 | 19 | | | | | j |
| | 00.4 | 11 | | | \dashv | _ | 100 | | | | | | ļ |
| <u> Millilli</u> | 204 | 11:52 | | - 1 | <u> </u> | , l | 100 | 20 | لــا | 3. 是16.4 | | | |

| TT4 TD3 | 0 400 | OGT 4 | and a | T\ | T | _ | | | | | | | |
|--------------------------|-------------------|--------------|--------------------|--|--------------|------|-----------------|--------------|---------------|-------------------|--|------------|-------------|
| 1 | & ASS | | - | INC. | | | | 90 | \T | | DING/DDADE NEW/DED | DIO | |
| | V Sixth. | - | ıe | | | | | D(| | L BU | RING/PROBE NUMBER | B-16 | |
| Portlar | ıd, Oreg | on | | | | | | | | | | | |
| (503) 7 | 96-0717 | | | | HA | ΙL | OGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SAI | MP. | LING I | MET: | Ю | D: | 4' Continous Core | START | FINISH |
| Bri | x Marit | ime C | ompan | ıy | DR | ILI | ING M | ETE | IOI |); | Direct Push | Time: | Time: |
| 1 | 30 NW S | | - | - | EQ | UII | MENT | 'TY | PE | | Geoprobe | 9:25 | 11:23 |
| | tland, C | | | | _ | | ER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | | n egon | 5074 | <u> </u> | | | | ONT | 'RA | CTOR: | Geo Tech Explorations, Inc. | 29-May-01 | 1 |
| } | | | | | | | | | $\overline{}$ | | BORING DIAMETER: 2" | 20 1124 01 | 25-141ay-01 |
| | - * , | | 图 | 直是(| ر بے | ᆲ | Σĭ | et) | 图 | | | .11 | |
| | には | 邑 | PA C | 15 to 19 | SP | NA I | ·西(| (fe | WA | STRATA (USCS) | CASING DIAMETER: Not Applica | | |
| | | TIME | ADSPA (ppm) | F 유전 | RE | EB | [δ. (%) | TH | 2 | \(\frac{1}{2} \) | SURFACE ELEVATION: Not Survey | | |
| ABANDONMENT DETAILS | SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | Z | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 55 E | TOP OF CASING ELEVATION: Not Applica | able | |
| AB. | | | H | 13 E | | ٦ | P4 | | GR | : | SOIL DESCRIPTION | | |
| THIND | | l | | <u> </u> | 1 1 | | 100 | l | ┼ | W2020 | 5012 51351111 [1011 | | |
| | - | | | | | | 100 | 21 | | SP | SAND - light brown, moist, medium dens | | a. |
| | <u> </u> | <u> </u> | | | 1 | _ | 100 | | 1 | | grained, porrly graded, non-plastic, no pe | troleum | |
| | | | | | | | 100 | 22 | | 257 | odor, sheen, or discoloration | | |
| 3/8-inch Bentonite Chips | | | | | | | 100 | 1 |] | 100 | | | |
| | | | | 1 | | _ | 100 | 23 | 5/29/01 | | | | |
| | 205 | 12:01 | 13.2 | <u> </u> | - | | 100 100 | 24 | 6/2 | | SAND - as above, no petroleum odor, she | en, or | |
| | 206 | 12:10 | 9.6 | ND/121 | | _ | 100 | 44 | \vdash | | discoloration | | |
| | 200 | 12.10 | - 0.0 | Tibizba | \vdash | | 100 | 25 | | 777777 | | | |
| | | <u></u> | | i - | | | 100 | <u> </u> | \equiv | | | | |
| Marille 1 | | | | | | | 100 | 26 | \equiv | | | | |
| | | | | | | | 100 | | | | Silty CLAY - light gray, very moist, stiff, | no | |
| | 207 | 12:11 | 9,6 | | | | 100 | 27 | | | petroleum odor, sheen, or discoloration | | |
| | | | - | ļ - - | | _ | 100 | 28 | | | | | |
| | | ! | | | | | 100 | _20 | F | | ATTEMPTED GROUNDWATER SAMPI | ফ | |
| 1 | | | | | | | | 29 | |] | Installed a temporary 1-inch ID stainless | | i |
| j | | | <u> </u> | | | | | | 1 | | point with a 0.010-inch slotted screen at | | |
| | | | | | | | | 30 | 1 | | bgs. No water was encountered. Well po | | |
| | | | | | | | | |] | ļ | removed and boring abandoned. A ground | lwater sar | nple |
| | | | <u> </u> | | | | | 31 | | | could not be collected. | | |
| | | | | | | | | 32 | l | ļ | | | |
| Ì | | | | ! ! | | - | | 0.4 | ł | | Boring terminated at 28 feet bgs | | |
| | | | - | - | | - | | 33 | i | } | Sampled to 28 feet bgs Boring abandoned with 3/4-inch Bentonit | - (Thi | |
| | - | | | | | | | | 1 | | Boring abandoned with 3/4-inch Bentonit | e Chips | |
| | | | | | | | | 34 |] . | | | | |
| | | | | | | | | | | | | | |
| | | | <u> </u> |) | <u> </u> | 1 | | 35 | Ì | | | | |
| | | | | | | | | | | | | | |
| | | | ļ <u>-</u> | | _ | | 36 | | | | | | |
| | | | <u> </u> | | | | 04 | | | | | İ | |
| | | - | | | | | 37 | | | | | | |
| [| | | | | \dashv | | 38 | | | | | | |
| j f | | | | + | | 90 | | | | | | | |
| 1 | | | | | | 1 | | 39 | | ! | | | İ |
|] | | | | | | | | | | | | | |
| 4 I | | | | | | _ | | | | | | | |

| HAHN & ASSOCIATES, 434 NW Sixth Avenue Portland, Oregon | INC. | | <u> </u> | sc | —)D | L BOI | RING/PROBE NUMBER | B-17 | |
|---|--|----------------------|-----------------|---|-------------|------------------|--|--------------|-------------|
| (503) 796-0717 | | HAI I | OGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJECT: | | SAMI | LING I | MET | HO | D: | 4' Continous Core | START | FINISH |
| Brix Maritime Compa | ау [| DRIL | LING M | ETH | IOI |); | Direct Push | Time: | Time: |
| 9030 NW St. Helens R | oad | EQUI | PMENT | נידיי | PE | | Geoprobe | _ 15:42 | 17:39 |
| Portland, Oregon | | DRIL | LER: | | | | Marcus Johnson | Date: | Date: |
| PROJECT #: 507 | 1 | DRIL | LING C | ONT | RA | CTOR: | Geo Tech Explorations, Inc. | 29-May-01 | 29-May-01 |
| TN E | 티급급 | . 7 | | 3 | 뛉 | 1 | BORING DIAMETER: 2" | | |
| I LE LE CONTROL | Prot | YY. | ER | (fee | YAT | S I | CASING DIAMETER: Not Applic | able | |
| IDONM IDONM AMPLI JMBEI TIME ADSPA (nnm) | E + X | 照照 | (%) (%) | H | ğ | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| ABANDONMENT DETAILS SAMPLE NUMBER* TIME HEADSPACE (nnm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT INTERVAL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 12 D | TOP OF CASING ELEVATION: Not Applic | able | |
| AB, | AFE |) <u> </u> | PE 1 | A | 8 | • | SOIL DESCRIPTION | | |
| Asphalt | | | 100 | | | Asphait | Asphalt | | |
| | | | 100 | 1 | | 23 | Gravely SAND with some Silt - light gra | y, moist, | |
| | | {_ | 100 | 2 | | SW | medium dense, well graded, medium gra | | |
| | 1 | | 100 | | | 1 | plastic, no petroleum odor, sheen, or disc | coloration | |
| | | | 100 | 3 | | *** | | | |
| 215 15:47 6.9 | | | 100 | 4 | | THE COLUMN | | | |
| 213 10.41 0.5 | | - | 100 | <u> </u> | | 14. 15 | Gravely SAND with some Silt - as abov | e, petroleu | ım |
| | | | 100 | 5 |] | | odor, no sheen, or discoloration | - | |
| | | | 100 | | | | | | |
| | | + | 100 | 6 | | | | | : |
| | 1 - 1 | _ - | 100 | 7 | 1 | | | | |
| | | | 100 | | | | g., | | |
| 216 15:50 6.5 | - 1 | | 100 | 8 | | SP | SAND - light gray, moist, loose, poorly grandly medium grained, non-plastic, petroleum | | |
| | - | | 100 | 9 | | | sheen or discoloration | odor, no | |
| | <u> </u> | | 100 | | | 4 | | | |
| | | | 100 | 10 | | | · | | |
| | - | _+- | 100 | 11 | | 6.6 | | | |
| | -{ | _{- | 100 | 11 | | 46.4 | | | - |
| 217 15:53 10.6 | ND/ND | V | 100 | 12 | | SP | SAND - as above, petroleum odor, no she discoloration | en or | |
| | | _ | 100 | | } | | Hiscologation | | |
| | | | 100 | 13 | | 994 | | | |
| | | | 100 | 14 | | | | | |
| | | \dashv | 100 | | | | | | |
| | | | 100 | 15 | | | | | |
| | | | 100 | | | | SAND - as above, petroleum odor, no she | en or | |
| 218 16:01 9.2 | - [| - | 100 | 16 | i | SP | discoloration | |] |
| | | | 100 | 17 | l | -4-0-0 | | | |
| | | _ | 100 | | | | | | } |
| | | | 100 | 18 | | 10 mg/m | | | |
| | | | 100 | آت. | | | | | |
| | | | 100 | 19 | | | SAND - as above, petroleum odor, no sh | een or | l |
| 219 16:12 13.4 | - | + | 100 | 20 | | SP | discoloration | | j |

5074 B-14-B-30 FINAL

| TAI | <u> </u> | & ASS | OCTA | DOING: | Dra | | | | | | | | | |
|---------------------------|----------|-------------------|--|--------------------|--|--------------|---------|--|--------------|-------------|------------------|--|---------------|-----------------|
| | | & Ass Sixth | | - | LINC. | ١ | | | 80 |) T | r BO | RING/PROBE NUMBER | B-17 | |
| 1 | | | | ıe | | ļ | | | D. | 71. | LDO | THE TODE NOTEDIAL | 13-T. | |
| | | d, Oreg | | | | <u> </u> | _ | | | | | | | |
| | | 6-0717 | | | | | | OGGE | | | | Jason M. Greifer | DRILL | DRILL |
| PRO |)JE | CT: | | | | SA | MP | LING | VET. | но | D: | 4' Continous Core | START | FINISH |
| | Bri | k Mariti | ime Co | ompan | y | DR | ILI | LING M | ETF | IOI |): | Direct Push | _Time: | Time: |
| 1 | 903 | 0 NW S | t. Hel | ens Ro | ad | EQ | UI | PMENT | YT' | PE | | Geoprobe | 15:42 | 17:39 |
|] | Por | tland, C |)regon | <u> </u> | | DR | ILI | LER: | | | | Marcus Johnson | Date: | Date: |
| PRO | ĴΈ | CT #: | | 5074 | | DR | ILI | JING C | ГИO | RA | CTOR: | Geo Tech Explorations, Inc. | 29-May-01 | 29-May-01 |
| Ę | | i | | F-1 | H-3 | 1 | | | | 떩 | | BORING DIAMETER: 2" | | |
| 包 | ړ | 田茶 | | Ş | Ota | 님 | ĄĽ | RY | eet | Ā | 4 | CASING DIAMETER: Not Applie | able | |
| £ | 1 | PL BE | TIME | 15 (E) | K T T | | E. | OVE (%) |) E | ĬŠ. | A S | SURFACE ELEVATION: Not Surve | | |
| | | SAMPLE NUMBER* | | ADSPA (ppm) | HCH | CORE/SPT | TE | RECOVERY (%) | LI | E | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applie | - | |
| ABANDONMENT | ٦ | S Z | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | ಶ | Z | RE | DEPTH (feet) | GROUNDWATER | \ \oldots | 202 Of Oriolate Bill village. Tributippin | 34,510 | |
| ₹ | | i | | <u> </u> | I L | | | | | Ö | <u> </u> | SOIL DESCRIPTION | 1 | |
| | | | | | | | | 100 | | Ī | | | | |
| u_{ii} | | | | <u> </u> | ļ | | | 100 | 21 | 4 | | | | |
| 3/8-inch Bentonite Chips | | | - | | | | | 100 | 22 | | SP | SAND - light gray, moist , loose, medium poorly graded, non-plastic, petroleum of | | _ |
| 8€ | M | | <u> </u> | <u> _</u> | | | - | 100 | | 7 | | or discoloration | tor, no snee | 2 n. |
| <u>§</u> ÷Ø | M | 220 | 16:21 | 123 | 10.9/ND | | | 100 | 23 | Ē | | | | |
| Ø₽ B | | | | | | | | 100 | | 5/29/01 | CL | Silty CLAY - dark gray, moist, medium : | stiff slighti | ler |
| 3/8-inch Bentonite Chips | | | ļ | | <u> </u> | | <u></u> | 100 | 24 | | tiiniini | plastic, petroleum odor, no sheen or disc | | .5 |
| શ્રું જ | M | | <u> </u> | | ļ | - | | 100 100 | 25 | | | | | |
| 8≅ | | | <u> </u> | 1 | <u> </u> | 1 | | 100 | 20 | | | | | |
| $\mathbb{Z}_{\mathbb{Z}}$ | m | | | | | - | | 100 | 26 | | | | | |
| | | | | | İ | | | 100 | | \equiv | | | | |
| | | 221 | 16:35 | 8.8 | - | | | 100 | 27 | | CL | Silty CLAY - as above, no petroleum od | or, sheen, o | or |
| | | <u> </u> | | <u> </u> | | | _ | 100 100 | 28. | | | discoloration | | i |
| 77777 | | | | <u> </u> | ! | | | 100 | 20. | P | | 4 | | |
| l | | | | | | | | | 29 | | | • | | |
| 1 | Ì | | | | | | | | | 1 | l | GROUNDWATER SAMPLE | | |
| 1 | İ | | | | | | | | 30 | | | Installed a temporary 1-inch ID stainles | s steel wel | Į į |
| | j | | | | | | | | | 1 | | point with a 0.010-inch slotted screen at | : 24 to 28 fe | et |
| | Į | | | | | <u> </u> | | | 31 | - | | bgs. Following the removal of approxim | ately 500 r | nl of |
| | | | | | | | | | 32 | ĺ | (| water the well point was purged dry, aft groundwater sample (#5074-010529-109 | | |
|) | Ì | | | | <u> </u> | | | | - | ĺ | ĺ | with a vacuum pump and disposable tul | | |
| } | İ | | | | | | | | 33 | Ì | | at 17:35 hours, 5/29/01. After sampling | | |
| ļ | [| ٠. | | | | | | | | 1 | ĺ | was removed and the boring was abando | oned. | j |
| | 1 | | | | | | | | 34 | [| (| A 1 | |) |
| | | | | | | | _ | | | l | [| A sheen was noted on the groundwater a | sampte | 1 |
| | 1 | | | | | | ; | <u></u> | 35 | 1 | | | | |
| } | + | | | | | | | | 36 | | | Ì | | ł |
| [| ŀ | | | <u></u> | | | | | | | , | Boring terminated at 28 feet bgs | | 1 |
| ľ | ŀ | | | | | | | | 37 | | | Sampled to 27 feet bgs | | } |
| 1 | 1 | | | | | | | | | 1 | | Boring abandoned with 3/4-inch Benton | ite Chips | { |
| | | | | | | | | | 38 | | | | | į |
| |]. | | | · _ | | | | | | | ļ | | | ł |
| | } | | | | | ,- | | | 39 | | | | | } |
| | f | | | | | | - | | 40 | | | | | 1 |

5074 B-14-B-30 FINAL

| HAHN & 434 NW S | | | • | INC. | | | | sc |) U | L BO : | RING/PROBE NUMBER | B-18 | |
|---|--|----------|--------------------|--|----------|--------|-----------------|--------------|-------------|------------------|---|------------|-------------|
| Portland, | Oregon | ı. | | | | | | | | | | | |
| (503) 796- | 0717 | | | | HA | ΊL | OGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJECT | r : | | | | SA | MP | LING I | METI | HO: | D: | 4' Continous Core | START | FINISH |
| Brix M | Maritim | ie Co | mpan | y | DR | ILI | LING M | ETH | OI |): | Direct Push | Time: | Time: |
| 90301 | NW St. | Hele | ens Ro | ad. | EQ | UI | PMENT | r TYI | PE | | Geoprobe | 13:45 | 15:40 |
| Portla | ınd, Or | egon | | | DR | ILI | LER: | | | | Marcus Johnson | Date: | Date: |
| PROJECT | | | 5074 | | DR | ILI | ING C | ONT | RA | CTOR: | Geo Tech Explorations, Inc. | -4 | 29-May-01 |
| E | | | 63 | 600 | Γ | - | | | Ή | | BORING DIAMETER: 2" | | · |
| ABANDONMENT DETAILS SAMPLE | a # . | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | Ą | RY | DEPTH (feet) | GROUNDWATER | A C | CASING DIAMETER: Not Applic | able | |
| A LEGAL | NUMBER* | TIME | ADSPA (ppm) | ESI C | S | KV. | RECOVERY (%) | H (f | MA MA | STRATA (USCS) | SURFACE ELEVATION: Not Surve | | |
| | | F | (£) | H CH | I E | TE | ပ္ပံ့ ေ | PT | E | E 25 | TOP OF CASING ELEVATION: Not Applic | | |
| Aga w | | - { | | A E E | ಶ | Z. | RE | E | ĮŽ. | ω.) | | | · |
| -E | | | | н г | <u> </u> | | | | 2 | <u> </u> | SOIL DESCRIPTION | | |
| Cement | | | | <u> </u> | _ | | 100 | ١. | 1 | Cement | Cement Floor | | |
| | | | | <u> </u> | <u> </u> | - | 100 | 1 | 1 | Ş GW } | Pea GRAVEL - gray, dry, medium graine | | |
| | }- | | | | | _ | 100 | 2 | l | 46 | graded, dense , non-plastic, no petroleum or discoloration | odor, she | en, |
| | | | | | | | 100 | <u> </u> | | | ordiscoloration | | ı |
| | | | | | | | 100 | 3 | | | | | |
| | 200 | ~ == \ | | | | | 100 | ١. | | SP | SAND - light brown, dry, loose, medium | grained. | |
| | 208 1 | 3:51 | 1.2 | ! - | | | 100 100 | 4 | ł | 10 | poorly graded, non-plastic, no petroleur | | en, |
| | | | | | | _ | 100 | 5 | | | or discoloration | | |
| | i | | | | | | 100 | <u> </u> | | 10.25 | | | |
| | | | | | | | 100 | 6 | | 280 | | | |
| | | | | | | | 100 | _ | | | | | |
| | | | | <u> </u> | <u> </u> | _ | 100 | 7 | | | | | |
| | 209 1 | 3:56 | 3.0 | - | 1 | 7 | 100 | 8 | | SP | SAND - as above, petroleum odor, sheer discoloration | ı, and | |
| 0 2 1 | | | | | | | 100 | | | | uiscoloration | | |
| Chips | | | | | | | 100 | 9 |] | | | | |
| 828 | | | | <u> </u> | | | 100 100 | 10 | | | | | |
| antonite | - | | | [| - | | 100 | 10 | | | · | | |
| | | - + | | <u> </u> | | | 100 | 11 | | 340 | | | |
| 83M | <u>-</u> - | | i | *** | | | 100 | | | | SAND - as above, slight petroleum odor, | no shoon | - [|
| | 210 1 | 4:01 | 3.5 | - | | | 100 | 12 | | SP | and no discoloration | по висеи, |] |
| N 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | | _ | | 100 | | | | | | Ī |
| | | | } | | | | 100 | 13 | | 3 | | | Í |
| | | | | | | - | 100 | 14 | | | | | į |
| | | \dashv | | | | | 100 | | | | | | 1 |
| | | | | | | | 100 | 15 | | | | _ |) |
| | 211 14 | 4:11 | 5.5 | ND/ND | | | 100 | | | SP | SAND - as above, slight petroleum odor, and no discoloration | no sheen, | - |
| | | | | | _ | | 100 | 16 | | | and no discoloration | | ļ |
| | | | | | | | 100 | 1,77 | | | | | , |
| | | | } | i | - | - | 100 | 17 | | TO | | | j |
| | | | | | { | | 100 | 18 | | | | | 1 |
| | | | | | _ | 7 | 100 | 一 | | | | | j |
| | | | | | | | 100 | 19 | | en en | SAND - as above, slight petroleum odor | , no sheen | or |
| | | \Box | | | | \Box | 100 | | | SP | discoloration | | 1 |
| | 212 14 | 1:19 | 8.5 | | | | 100 | 20 | | 344 | | | |

5074 B-14-B-30 FINAL

| | - 0 ACC | · ACTA | and a | ~~~ | \neg | | | | | | | | |
|---------------------------------------|-------------------|-----------------|--------------------|--|--------------|---------------|-----------------|--------------|-------------|------------------|--|-------------|---------------------------------------|
| | I & ASS | | • | INC. | | | | 9(| ΛT. | TRA | RING/PROBE NUMBER | סד כד | |
| I | W Sixth | | 16 | | | | | 5 | بدار | LI DV. | KING/PRODE NORTH | B-18 | |
| ! | nd, Oreg | | | | <u></u> | - | | | | | | | |
| | 96-0717 | <u> </u> | | | | | LOGGEI | | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | _ | | | - | | PLING I | | | | 4' Continous Core | START | FINISH |
| 1 | ix Mariti | | _ | _ | \vdash | | LING M | | | | Direct Push | Time: | Time: |
| 902 | 30 NW S | št. Hel | ens Ro | oad | EC | ξ <u>υτ</u> | IPMENT | r TY | PE | | Geoprobe | 13:45 | 15:40 |
| | rtland, C | O <u>rego</u> r | | | | | LER: | | _ | | Marcus Johnson | Date: | Date: |
| PROJE | :CT #: | | 5074 | | DF | aili | LING C | ONT | .RA | .CTOR: | Geo Tech Explorations, Inc. | 29-May-01 | 29-May-01 |
| Ė | | | E E | 트교급 | ,]_ | | | 3 | ER | | BORING DIAMETER: 2" | | |
| ABANDONMENT DETAILS | SAMPLE NUMBER* | T-3 | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | • पि | AL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 4 ²⁵ | CASING DIAMETER: Not Applica | able | |
| NO. | API ABE | TIME | ADSPA (ppm) | G, S, X | E/S | R | OVE (%) | H(| DW | STRATA (USCS) | SURFACE ELEVATION: Not Survey | 7ed | · · · · · · · · · · · · · · · · · · · |
|) New Year | JAN J | TI | A ₽ | 3 B | CORE/SPT | INTERVAL | | H | N | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | | |
| BAJ | w Z | , | 田 | TPH THE | O | | R. | DF. | iRO | 02 | | | |
| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | Ļ' | ļ | | | ' | <u></u> | <u> </u> | ۳ | 11.000 3.00 | SOIL DESCRIPTION | | |
| | | | | | + | ┼- | 100 | 21 | | SP | SAND - light gray, moist loose, medium | | |
| mille | | <u> </u> | | | + | - | 100 | 1 41 | + | Dr . | poorly graded, non-plastic, slight petrole | | no |
| W g. Ø | | + | | | + | + | 100 | 22 | 2 | C B of | sheen or discoloration | | |
| | | | <u></u> | | İ | | 100 | | 1 | | | | |
| 图章图 | ' | | <u></u> | |]_ | <u></u> | 100 | 23 | 5/29/01 | | (2) | | |
| 3/8-inch Bentonite Chips | 213 | 14:28 | 4.8 | 1.14/ND | + | <u> </u> | 100 | 24 | 5/2 | | SAND - as above, slight petroleum odor, | , no sheen | or |
| WEW W | X10 | 14.20 | 1 4.0 | T-T-AT-1" | +- | Y - | 100 | 1 41-4 | + | 7////// | 7 | | |
| | | | | | + | + | 100 | 25 | ı | U CL | Silty CLAY - gray, moist, soft, slightly pl | astic, no | |
| 1089 | | | | | 工 | | 100 | | | | petroleum odor, sheen, or discoloration | - | - |
| Minille | <u></u> | Ι | Ι | <u> </u> | ユ | | 100 | 26 | | | | | |
| AMMIN. | | | | | +- | +- | 100 | 27 | \searrow | <i>4/////</i> | | | |
| WIIIIA | | + | + | 1 | + | +- | 100 | | | | Silty CLAY - as above, no petroleum odo | h 0011 | |
| | 214 | 0:00 | 3.1 | <u> </u> | + | ₩_ | 100 | 28 | | Luuu | | r, sneem, | or |
| - | | | | | | <u>-</u> | | | | | distort and i | | |
| ' | | | Ι | | 1 | ' | | 29 | 4 | | 1 | | |
| , | | | | | 4 | | <u> </u> | 30 | | | GROUNDWATER SAMPLE . | | |
| 1 | | ' | | 1 | + | | 1 | 1 | 4 | | Installed a temporary 1-inch ID stainles | | |
| 1 1 | | | | | + | | + | 31 | 1 / | 1 | point with a 0.010-inch slotted screen a | t 24 to 28 | feet |
| 1 | <u> </u> | | | <u> </u> | 1 | | - | | | | bgs. Following the removal of approxim water the well point was purged dry, after the | | |
| | | | | | | | | 32 | 4 / | l | water the well point was purged dry, and groundwater sample (#5074-010529-107 | | |
| ļ ! | | | | | 1 | | | | 1 | | with a vacuum pump and disposable tul | bing/check | k valve |
| 1 | ـــــا | | 1 | | +- | | | 33 | 4 ' | 1 | at 15:18 hours, 5/29/01. After sampling | g, the well | |
| | | | | | + | —- | 1 | 34 | 1 | | was removed and the boring was aband | oned. | |
| 1 | | | | } | +- | | | | 1 1 | | | | |
| | | | | | | | | 35 | 4 1 | 1 | Boring terminated at 28 feet bgs | | |
| | | | | | | | | | 1 1 | | Sampled to 28 feet bgs | . | |
| | <u> </u> | | <u> </u> | <u></u> | <u> </u> | لــــــ | | 36 | 4 1 | | Boring abandoned with 3/4-inch Bentoni | te Chips | |
| () | | | - | | — | | | 37 |] 1 | - | 1 | | |
| 1 | | | | | ┼ | | | 1 2. | 1 | 1 | 1 | | |
| 1 | | | | | +- | | | 38 |] / | 1 | 1 | | |
| l r | | | | <u> </u> | + | | | <u> </u> | 1 | 1 | ļ · | | |
| 1 | | | | | | | | 39 |] | 1 | 1 | | |
| 1 | | 1 | لـــــا | <u> </u> | 1 | | <u> </u> | ار. آ | 1 1 | | 1 | | |
| 4 1 | , , | 1 , | 1 1 | 1 | 1 | į | į . | 40 | 4 1 | 1 | 1 | | |

5074 B-14-B-30 FINAL

| HAHN | & ASS | OCIA | TES, | INC. | Π | | | | | | |
|------------------------|-------------------|----------|--|--|--|----------|-----------------|--------------|-------------|------------------|--|
| 434 NW | | | • | | | | | SC |)] | L BO | RING/PROBE NUMBER B-19 |
| Portlan | d, Oreg | on | | | | | | | | | |
| (503) 79 | | | | | HA | ΊL | OGGE | R: | _ | | Jason M. Greifer DRILL DRILL |
| PROJE | CT: | | | | SA | MP | LING | MET | HÇ | D: | 4' Continous Core START FINISH |
| Bri | x Mariti | ime Co | ompan | v | DI | III | LING M | ETI | IO | D: | Direct Push Time: Time: |
| i | 0 NW S | | _ | • | | | PMENT | | | | Geoprobe 13:45 15:40 |
| 1 | tland, C | | | au | <u> </u> | | LER: | | ~ ~ | | Marcus Johnson Date: Date: |
| PROJE | | <u> </u> | 5074 | | 1 | | | ONT | R/ | CTOR: | Geo Tech Explorations, Inc. 24-May-01 24-May-01 |
| ····· | • | | <u> </u> | | | | <u> </u> | | 7 | 1 | BORING DIAMETER: 2" |
| ABANDONMENT DETAILS | æ1 * | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | Ĕ | - | ₹ | DEPTH (feet) | GROUNDWATER | | CASING DIAMETER: Not Applicable |
| N I | SAMPLE NUMBER* | 图 | E H | | CORE/SPT | | RECOVERY (%) | 3 | W | STRATA (USCS) | |
| | N N | TIME | ADSPA (ppm) | BE 함집 | [문 | 筥 | %) (%) | Ĭ | | LIS (R | |
| NĀ | N N | | (EA | PH PH PH | 응 | Z | 贸 | 岗 | | 2 C | TOP OF CASING ELEVATION: Not Applicable |
| | | | I | 17 5 | | | <u> </u> | Н | 5 | | SOIL DESCRIPTION |
| Asphalt | | | | <u> </u> | ļ . | | 100 | 1 | | Asphait. | Ashpalt |
| | | <u> </u> | <u>, </u> | | <u>† </u> | | 100 | | 1 | | GRAVEL with some Sand - light brown, dry, medium |
| | | | | | | | 100 | 2 | 2 | | dense, poorly graded graded, medium grained, non- plastic, no petroleum odor, sheen, or discoloration |
| | | | | | | | 100 | 1 |] | | production of the control of the con |
| | | | <u> </u> | <u> </u> | - | _ | 100 | 3 | 4 | CD | |
| | 021 | 11:36 | 3.3 | | ├-, | <u> </u> | 100 | 4 | | SP | SAND - light brown, moist, loose, medium grained, |
| | | | 0.0 | | | <u> </u> | 100 | <u> </u> | | | poorly graded, non-plastic, no petroleum odor, sheen, |
| | | | | | <u> </u> | | 100 | 5 | | | or discoloration |
| | | | | | <u> </u> | | 100 | _ | | | |
| | - | <u> </u> | <u> </u> | | <u> </u> | ļ | 100 | 6 | | SM | Silty SAND - light brown, moist, loose, medium |
| | 022 | 11:43 | 5.0 | | 1 | | 100 | 7 | , | | grained, slightly graded, non-plastic, no petroleum odor, sheen, or discoloration |
| | | | | | - | | 100 | | 1 | 92700 | 0001, 110011, 01 0100101111011 |
| | | | | | 1 | | 100 | 8 | | | |
| [] g []] | | | | | | | 100 | _ | | | |
| B B B | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | | 100 | 9 | - | | SAND - light brown, moist, loose, medium grained, |
| | 023 | 11:51 | 16.1 | | - | | 100 | 10 | ļ | SP | poorly graded, non-plastic, petroleum odor, no sheen |
| | | | | | | | 100 | | 1 | | or discoloration |
| | | | | | | | 100 | 11 | | | |
| | | | | | | | 100 100 | 10 | l | | |
| | | | | <u> </u> | | | 100 | 12 | } | | |
| | | | | | | | 100 | 13 | | | |
| | | | | | | | 100 | | 1 | | |
| | | | | | | | 100 | 14 | | | |
| | | | | | | | 100 | 17 | | | į l |
| | 024 | 11:55 | 23.8 | ND/- | | | 100 | 15 | 1 | | SAND - as above, petroleum odor, no sheen or |
| | UAT | TT-00 | 40.0 | 1117/- | | | 100 | 16 | | SP | discoloration |
| | | | | | | | 100 | | | | |
| | | | | | | | 100 | 17 | | | |
| VIIIII. | | | | | | | 100 | | | 33.5 | |
| | | | | | | _ | 100 | 18 | | | |
| William . | 026 | 12:03 | 27.1 | | \dashv | - 1 | 100 | 19 | | | SAND - as above, slight odor, no sheen or |
| Willia. | UZO | 12:00 | ا ۱۰۱۵ | - | \dashv | - | 100 | 19 | | | discoloration |
| Willin. | | | | | | | 100 | 20 | | 284 | |

| TTATIN | & ASS | OCTA | कार्याः | TATC | Γ | | | | | | | | |
|--|-------------------|--------------|--------------------|--|--|---------------------|-----------------|--------------|-------------|------------------|---|------------|-------------|
| | V Sixth . | | | TIAC. | | | | SC |)[] | L BO | RING/PROBE NUMBER | B-19 | |
| | id, Oreg | | ,C | | | | | ~ | , a | ے ہے۔ خبطہ اسط | tolk tolk and or as as a second | ي پير حيد | |
| | 96-0717 | | | | HA | | OGGEF | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | | | LING M | | HO: | D: | 4' Continous Core | START | FINISH |
| • | x Mariti | ime C | ompan | ı v | - | | ING M | | | | Direct Push | Time: | Time: |
| 1 | 30 NW S | | _ | ~ | | | MENT | | | | Geoprobe | 13:45 | 15:40 |
| | rtland, C | | | - | DRI | | | | | | Marcus Johnson | Date: | Date: |
| PROJE | | | 5074 | | | | | ONT | RΑ | CTOR: | Geo Tech Explorations, Inc. | ⊣ | 24-May-01 |
| Ę | | | E | 단교급 | | | | 3 | 品 | | BORING DIAMETER: 2" | | |
| MES. | 四族 | ray | ACI | TOIL Pote | ĮŸ. | AL. | JRY | feet | /AT | _{₹ 60} | CASING DIAMETER: Not Applica | able | |
| FALL | API ABE | TIME | ADSPA (ppm) | 3ES G, 7 Ox (| 图 | ਮੁੱ | S S | H. | MQ. | STRATA (USCS) | SURFACE ELEVATION: Not Survey | | |
| ABANDONMENT DETAILS | SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | SE | TOP OF CASING ELEVATION: Not Applica | able | |
| ABA | | | | App | | <u> </u> | | ā | GR | | SOIL DESCRIPTION | , | |
| | | | <u> </u> | <u> </u> | 1-1 | 4 | 100 | 91 | | SP | SAND - light gray, very moist, loose, med | lium grain | ed. |
| Gmill. | 027 | 12:14 | 29.5 | ND/ND | ++ | + | 100 | 21 | 5/24/01 | STEEL STEEL | poorly graded, non-plastic, slight petrole | | |
| 3/8-inch Bentonite Chips | | | | | | 1 | 100 | 22 | 56 | | sheen or discoloration | | |
| # S | <u></u> | | <u> </u> | | 1 | _ | 100 | 09 | <u>L</u> | | | | |
| 10 to 10 10 10 10 10 10 10 10 10 10 10 10 10 | <u></u> | - | 1 | 1 | ++ | \dashv | 100 | 23 | +*- | Milling. | Silty CLAY - light gray, damp, stiff, sligh | | ic, |
| | | | <u> </u> | <u> </u> | 1 | \pm | 100 | 24 | | CL | no petroleum odor, sheen, or discoloratio | n | |
| | | | | <u> </u> | \Box | \dashv | 100 100 | | E | | | | |
| | | | 1 | 1 | - | \dashv | 100 | 25 | | 9///// | 1 | | |
| | 028 | 12:29 | 18.2 | - | | 寸 | 100 | 26 | | | SAND - light gray, moist to wet, loose, m | redium. | |
| | | | <u>-</u> | | \Box | \dashv | 100 | 27 | | SP | grained, poorly graded, non-plastic, sligh | | um. |
| | | | <u> </u> | | +- | $\dot{+}$ | 100 | 27 | | | odor, no sheen or discoloration | , | |
| | | | | | 1 | 士 | 100 | 28 | | | | | |
| | | | | | | $\overline{\bot}$ | | 30 | | | 1 | | |
| 1 | | | | | | + | | 29 | 1 | | GROUNDWATER SAMPLE | | |
| | | | | | | + | | 30 | , | } | Installed a temporary 1-inch ID stainless | | |
| | | | | | | | | | 1 | | point with a 0.010-inch slotted screen at bgs. Following the removal of approxima | | |
| 1 | | <u> </u> | | ļ | <u> </u> | -+ | | 31 | 1 | | water the well point was purged dry, after | er recharg | e, |
| | | | | | ļ — | + | | 32 | | } | groundwater sample (#5074-010524-102 | | |
| | | | ļ | | | I | | | | | with a vacuum pump and disposable tub at 13:48 hours, 5/24/01. After sampling, | | |
| | | | | | <u> </u> | \rightrightarrows | | 33 | | | was removed and the boring was abando | | ,011. |
| • | | | | | | + | | 34 | | | | | |
| | | | | | | # | | | | | Sampled to 26 feet bgs | | |
| | | | | | | + | | 35 | | | Boring abandoned with 3/4-inch Bentonia | te Chips | • |
| | <u> </u> | | - | | - | 1 | | 36 | 1 | | | | |
| [| | | | | | 7 | | 37 | | | | | |
| <u> </u> | | | | | | - | | <u> </u> | | | | | , |
| ! | | | | | | \perp | | 38 | | 1 | | | 1 |
| | | | | | | 4 | | 39 | | ! | | | ! |
| ' | | | | - | <u></u> | + | | 35 | | 1 | | | |
| Į ' | - | | - | | - | -i - | | 40 | | 1 | | | |

| HAHN | & ASS | OCIA | TES. | INC. | 1 | | | | | | |
|---|-------------------|--|--------------------|--|--|----------|-----------------|--------------|--------------|------------------|---|
| Į. | V Sixth | | | | | | | SO | \mathbf{I} | L BO | RING/PROBE NUMBER B-20 |
| Portlar | id, Oreg | OD | | | | | | | | | |
| 1 | 96-0717 | | | | HA | ΙL | OGGE: | R: | | | Jason M. Greifer DRILL DRILL |
| PROJE | | | | | SA | MP | LING | MET: | НО | D: | 4' Continous Core START FINISH |
| Bri | x Marit | ime C | meam | v | DR | ILI | LING M | ŒTH | IOI | D: | Direct Push Time: Time: |
| l | 0 NW S | | _ | - | \vdash | | PMEN | | | | Geoprobe 14:00 9:51 |
| | tland, C | | | Juu | - | | LER: | | | | Marcus Johnson Date: Date: |
| PROJE | | 71 egun | 5074 | | 1= | | | INO | 'RA | CTOR: | Geo Tech Explorations, Inc. 24-May-01 25-May-01 |
| [| | | | <u> </u> | | | | | | T | BORING DIAMETER: 2" |
| ABANDONMENT DETAILS | F-7 *- | ļ | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | Ę | 긤 | X | DEPTH (feet) | GROUNDWATER | 1 | CASING DIAMETER: Not Applicable |
| N N | SAMPLE NUMBER* | 图 | E PA | LAB RESULT TPH-G, Tota TPH Dx (ppm | CORE/SPT | \$V. | RECOVERY (%) | 3 | M | STRATA (USCS) | |
| ON | | TIME | (ppm) | P C Z | 图 | EE | %) [%) | | | | SURFACE ELEVATION: Not Surveyed |
| A P | 72 S | | E P | E PER | 8 | Z | ZE(| 員 | 뎒 | 2 5 | TOP OF CASING ELEVATION: Not Applicable |
| AB | | | | 13.5 | l | | | 1 | 5 | - | SOIL DESCRIPTION |
| Asphalt | | | | | | | 100 | | | Asphalt. | Ashpalt |
| AHHH. | | | |] | | | 100 |] | | sw | Gravely SAND with some Silt - light brown, moist |
| | | | <u> </u> | - | <u> </u> | <u> </u> | 100 | ١. | | J. SW | loose, medium grained, poorly graded, non-plastic, no |
| | | | <u> </u> | <u> </u> | - | | 100 | 2 | | . C. | petroleum odor, sheen, or discoloration |
| | 029 | 14:04 | 3.1 | - | | - | 100 | 3 | | | CANTO links house does - dissue does - adi |
| | | <u> </u> | | <u> </u> | <u> </u> | - | 100 | 1 | 1 | SP | SAND - light brown, dry, medium dense, medium grained, poorly graded, non-plastic, no petroleum |
| | | | | | | | 100 | 4 | 1 | - R | odor, sheen, or discoloration |
| | | ļ | | | <u> </u> _ | | 100 | 5 | ĺ | | |
| | | <u>. </u> | 1 | <u>}</u> | 1 | - | 100 | 1 0 | 1 | SP | Gravely SAND with some Silt - light brown, damp, |
| | | | <u> </u> | | - | - | 100 | 6 | | SP | loose, medium grained, poorly graded, no petroleum |
| | | | | ĺ | | | 100 | | 1 | 1 | odor, sheen, or discoloration |
| | 030 | 14:08 | 2.7 | - | | | 1,00 | 7 | | SP | |
| | | | <u> </u> | | <u> </u> | | 100 100 | 8 | | | SAND - light gray, dry, medium dense, medium grained, poorly graded, non-plastic, no petroleum |
| | | <u> </u> | <u> </u> | 1 | | — | 100 | - ° | 1 | | odor, sheen, or discoloration |
| | - | | | | | | 100 | 9 | | | ,, |
| | | | | | | | 100 | | | | |
| | | | | | | | 100 | 10 | ł | | , |
| (Cap (Cap (Cap (Cap (Cap (Cap (Cap (Cap | 007 | 74 10 | 0.0 | - | | | 100 | | | SP | SAND - as above, no petroleum odor, sheen, or |
| h Ber | 031 | 14:13 | 3.6 | | \vdash | | 100 100 | | | | discoloration |
| $\mathbb{Z}_{\mathbb{Z}}$ | | | | | | 7 | 100 | 12 | | | |
| | | | | | | _ | 100 | | | | |
| and a | | | | | | | 100 | 13 | | 40.5 | |
| | | | , | | | | 100 | | | 1993 | |
| | | | | | | _ | 100 | 14 | | | |
| | 031 | 14:20 | 5.4 | - | $\vdash \dashv$ | | 100 | 15 | | | SAND - as above, no petroleum odor, sheen, or |
| | A91 | 17,40 | U.¥ | - | - | | 100 | 10 | | SP | discoloration |
| | | | | | 4 | , | 100 | 16 | | | |
| | | | | | | | 100 | | | | |
| | | | | | \Box | | 100 | 17 | | | |
| | | | | | | | 100 | | | | |
| | | | | | | | 100 | 18 | | | SAND - as above, no petroleum odor, sheen, or |
| | 033 | 14:28 | 6.0 | | | { | 100 | 19 | | SP | discoloration |
| Willia) | - 550 | 1 | 2.0 | | | | 100 | 7.0 | ļ | | |
| | | | | | | , | 100 | 20 | ۱ ۱ | | |

5074 B-14-B-30 FINAL

| HAHN | & ASS | OCTA | TES | INC | | | | | | | | |
|--------------------------|-------------------|----------------|--------------------|--|--|--------------|--------------|-------------|------------------|--|---------------|-----------|
| 434 NW | | | | | | | S | CIC | L BO | RING/PROBE NUMBER | B-20 | |
| Portlan | | | | | | | | | | | | |
| (503) 79 | - | | | | HAI | LOGG | ER: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | | IPLING | | 'HO | D: | 4' Continous Core | START | FINISH |
| | x Mariti | me Co | mpan | v | DRI | LLING | MET | HOI | D: | Direct Push | Time: | Time: |
| 4 | o NW S | | _ | | EQU | прмеі | TY | PE | | Geoprobe | 14:00 | 9:51 |
| Por | tland, C | regon | | | DRI | LLER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | | | 5074 | | DRI | LLING | CON | ΓRΑ | CTOR: | Geo Tech Explorations, Inc. | 24-May-01 | 25-May-01 |
| Ţ | | | E | E = 3 | | | | ER | | BORING DIAMETER: 2" | | |
| E S | SAMPLE NUMBER* | F-7 | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 150 | CASING DIAMETER: Not Appli | cable | |
| PALI | API (| TIME | ADSPA (ppm) | G S X | SE 12 | | | ID W | STRATA (USCS) | SURFACE ELEVATION: Not Surve | yed | |
| NO DE | SA | T | 3AI (p | B H H | | | | É | | TOP OF CASING ELEVATION: Not Appli | cable | |
| ABANDONMENT DETAILS | 4 | | H | A L L | ٦ | 8 | Ī | GRO | | SOIL DESCRIPTION | Ŋ. | |
| | | | | | | 100 | | | ₹ SP | SAND - light gray, very moist, loose, m | edium grai | ned, |
| | | | | <u> </u> | | 100 | | 1 | | poorly graded, non-plastic, slight petro | leum odor, | no |
| 3/8-inch Bentonite Chips | - | | | | - | 100 | _ | 2 | | sheen or discoloration | | |
| | | | | | | 100 | |]_ | | Clayey SAND - light gray, moist, dense, | . medium | |
| Souit Silver | 034 | 14:41 | 4.2 | ND/ND | ! | 100 | 2 | 5/24/01 | SC | grained, slightly graded, non-plastic, no | | ı |
| Went (| | | | <u> </u> | - | 100 | | | | odor, sheen, or discoloration | | |
| | | | | | | 100 | | | | | | |
| | | | | <u> </u> | <u> </u> | 100 | | 5 | | | | |
| 0.9 | | <u></u> | <u> </u> | - | - | 100 | _ | 6 | | | | |
| | | | | | | 100 | | | CL | Silty CLAY - light gray, moist to wet, s | tiff, slightl | у |
| | 035 | 14:49 | 1.1 | - | | 100 | | 7 | | plastic, no petroleum odor, sheen, or d | | |
| | | | | | | 100 | | Ш | | | | |
| 33333 | | | | | | | | T | | | | |
| | | · - | | 1 | | | 1 29 | 킨 | | GROUNDWATER SAMPLE Installed a temporary 1-inch ID stainle | ace ctaal we | .17 |
| | | | | | | | 30 | 2 | | point with a 0.010-inch slotted screen a | at 24 to 28 f | eet |
| | | | | | | + | ٠, | ĺ | 1 | bgs. Following the removal of approximater the well point was purged dry, a | | |
| ļ | | | | | | - | 3. | + | 1 | (overnight), groundwater sample (#50' | 74-010525- | 103) |
| | | j | | | | | 32 | 2 | | was collected with a vacuum pump and | | |
| | | | | | | | ٠, | | | tubing/check valve at 09:47 hours, 5/28 sampling, the well point was removed a | | |
| | | 1 | | | | | 33 | 1 | - | was abandoned. | | |
| ļ | | | | | | | 34 | L | ļ | | | |
| | | | | | i T | _ | 35 | 5 | l | | | |
| | | | | | | | | | | Boring terminated at 28 feet bgs Sampled to 27 feet bgs | | |
| | | <u> </u> | | | | | 36 | 1 | | Boring abandoned with 3/4-inch Benta | onite Chips | |
| • | | | | | | | 37 | , | | _ | - | |
| i . | | 1 | | | | | | 1 | | | | |
| | | | | | | - | 38 | 4 | | | | 1 |
| { } | | | | | | + | 39 | |] | | | j |
| i l | | - ; | | | | 1 | 1 | 1 | | | | |
| 1 | | | | | | | 40 | | 1 | | | |

5074 B-14-B-30 FINAL

| BAHN 434 NW | Sixth . | Avenu | - | INC. | | | | sc |)I | L BO | RING/PROBE NUMBER B-21 | |
|------------------------|-------------------|----------------|--------------------|--|---|------------|-----------------|--------------|-------------|------------------|---|-------------|
| Portlan (503) 79 | _ | | | | H | ATT | OGGE | R. | - | | Jason M. Greifer DRILL DR | |
| PROJE | | | | | + | | LING | | HO | D· | | |
| 1 | v Mariti | ime C | יים מוווו | 37 | ř. | | LING M | | | | 7 7 7 | |
| | o NW S | | _ | • | | | PMEN? | | | <i>.</i> | G . 1 | |
| į | tland, C | | | au | — | | LER: | . 11 | ئد ـ | | | |
| PROJE | | vreRon | 5074 | | | | | ONT | TR.A | .CTOR: | Marcus Johnson Date: Date: Geo Tech Explorations, Inc. 24-May-01 24-M | |
| <u> </u> | 02 | | Г | | 1 | - | | | 7 | | BORING DIAMETER: 2" | ay-U1 |
| ABANDONMENT DETAILS | æ *÷ | | S | LAB RESULT TPH-G, Total TPH Dx (ppm) | Ţ | Ţ | 돭 | et) | GROUNDWATER | | CASING DIAMETER: Not Applicable | |
| ILE | PL | 租 | E PA | P. T. G. | 'SF | 3.77 | | I (fe | WA | ATA CSS | SURFACE ELEVATION: Not Surveyed | |
| | SAMPLE NUMBER* | TIME | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | K | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applicable | |
| NAS | SZ K | | 田 | E E E | ဗ | Ä | 盟 | 岡 | 301 | ₽ . | TOP OF CASING BLEVATION: Not Applicance | |
| A. | | | *** | H . H | | | | ı | 5 |] . | SOIL DESCRIPTION | |
| Asphalt | | | | | | | 100 | | | Asphalt | Ashpalt | |
| | | | ļ I | | | - | 100 | 1 | - | | SAND with trace Gravel - light brown/light gray, | |
| | | | | | - | - | 100 | 2 | | ŠP | moist, medium dense, medium grained, poorly graded, | |
| | | - | <u> </u> | <u> </u> | | | 100 | - | 1 | | non-plastic, petroleum odor, sheen, and discoloration | |
| | 001 | 8:40 | 718 | - | | | 100 | 3 | | A 7.44 | | |
| | | | | | | | 100 | | | 6,475 | | |
| | | <u> </u> | <u> </u> | | 1 | 7 | 100 | 4 | - | | | |
| | 002 | 8:44 | 1.572 | 1,370/NE | <u> </u> | | 100 | 5 | | · SP | SAND with trace Gravel - as above, petroleum odor, | |
| | | | , | | | | 100 | | 1 | 表形象 | sheen, and discoloration | |
| | | | | | | | 100 | 6 | | | | |
| | | | <u> </u> | <u> </u> | | | 100 | 7 | , | | | |
| | | | <u> </u> | <u> </u> | ! | | 100 | 1 | 1 | 12.3 | | |
| | | | | | - | , | 100 | 8 | | | | į |
| | | | | | | | 100 | | | | | |
| | | | | | | | 100 | 9 | 4 | 是 作品 | • | |
| E E E | 003 | 8:49 | 42.6 | _ | _ | | 100 100 | 10 | | SP | SAND - as above, petroleum odor, sheen, and | |
| | 000 | 0.40 | 214.0 | | 1 | | 100 | | | | discoloration noted | |
| Bentonite Chips | | | | | | | 100 | 11 | | 359 | | |
| ll uch | | | | | | | 100 | | | | | |
| | | | | <u> </u> | | | 100 100 | 12 | 1 | | | |
| | | | | | \vdash | | 100 | 13 | | | | |
| | | | | <u> </u> | | <u>-</u> - | 100 | | | | SAND - as shows notwelease of | |
| | 004 | 855 | 18.5 | - | | | 100 | 14 | | SP | SAND - as above, petroleum odor, sheen, and discoloration noted | |
| | | | | | | | 100 | | | | | |
| | | <u> </u> | · ! | | | } | 100 | 15 | | | | |
| | } | | | | | | 100 | 16 | | | | |
| | | | | | | - | 100 | 20 | | | | l |
| | | | i | | | | 100 | 17 | | 可意味 | | |
| | | | | | | | 100 | | | | GANTO 1 / 1 / 2 | 1 |
| | 005 | 9:03 | 13.7 | ND/- | _ | | 100 | 18 | | SP | SAND - as above, petroleum odor, sheen, and discoloration noted | |
| | | | | | | | 100 | 10 | | | CONTRACT TORU | |
| | | | | | \dashv | - | 100 | _19 | | | | - 1 |
| | - | | | | - | , | 100 | 20 | | | | |

5074 B-14-B-30 FINAL

| HAHN | P ACC | OCTA | משופים | TATO: | | | | | | | | | | |
|--------------------------------|-------------------|----------|--------------------|--|--|---------------|----------------------|--------------|-------------|------------------|----|--|-----------|--------------------|
| | | | | uvc. | | | | 96 | 177 | · DΩ | D | ING/PROBE NUMBER | Dor | |
| 434 NW | | | e | | | | | SC | ,11 | ı DU. | л | HACKLIODE MOMDEN | B-21 | |
| Portlan | | | | | | | | | | | | | T | |
| (503) 79 | 96-0717 | | | | HA | ΙL | OGGEI | ₹: | | | e. | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SAI | MP. | LING N | ÆT: | HOI | D: | 4 | 4' Continous Core | START | FINISH |
| Bri | x Mariti | ime Co | mpan | y | DR | ILI | ING M | ETH | IOD |); | I | Direct Push | Time: | Time: |
| ŀ | o NW S | | - | - | - | _ | MENT | | | | (| Geoprobe | 8:29 | 9:27 |
| 1 | tland, C | | | | | | ER: | | | | | Marcus Johnson | Date: | Date: |
| PROJE | | 71.0E01 | 5074 | | | | ING C | ONT | RA | CTOR: | _ | Geo Tech Explorations, Inc. | -1 | Date: 24-May-01 |
| | | | | l | t^- | | | | | ļ | 7- | BORING DIAMETER: 2" | | ar-may-or |
| EN. | ra *- | | 图 | of all (m) | Ę | ارب | ξX | et) | E | | - | CASING DIAMETER: Not Applic | abla | |
| NA 11.5 | 11c | 图 | E P | T. T. | SP. | Ž. | 臣二 | í (fe | WA | E & | - | | | |
| O.Y. | ME I | TIME | ADSPA (ppm) | 절년점 | RE | E I | (%) | H | 2 | STRATA (USCS) | - | SURFACE ELEVATION: Not Survey | | . |
| A C | SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | 2 E | F | OP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | , | | H | J F E | | _ | , , , , , | Д | GR | i | 1 | SOIL DESCRIPTION | | |
| | | | |] | | | 100 | | | Wood | 1 | Organics - wood | | |
| 3/8-inch Bentonite Chips | | | | | | | 100 | 21 | | ıııııı | | · | | |
| | | | | | \sqcup | _ | 100 | | 1 | | 1 | | | |
| | | | <u> </u> | <u> </u> | - | | 100 | 22 | | | 1 | | | |
| 3/8-inch Bentonite Chips | 006 | 9:14 | 6.9 | ND/ND | | \dashv | 100 | 23 | | CL | 1 | Silty CLAY - light gray, damp, stiff, no | petroleun | 1 |
| (L) (L) | 000 | J.1- | 0.0 | 1110/110 | | _ | 100 | 40 | 1 | | 1 | odor, sheen, or discoloration | | |
| | | | | | | , | 100 | 24 | <u> </u> | | 4 | | | |
| | | | | | $ldsymbol{eta}$ | | | | | _ | 7 | Groundwater not encountered | | |
| [| | | <u> </u> | | - | _ | | 25 | 1 | | 1 | D | | |
| | · | | - <u>-</u> | | | | | 26 | | | ı | Boring terminated at 24 feet bgs Sampled to 23 feet bgs | | |
| | | | | <u> </u> | | | | | 1 | | | Boring abandoned with 3/4-inch Benton | ite Chips | |
| 1 | | | | | <u> </u> | _ | | 27 | | | 1 | • | • | |
| f ¦ | | | | <u> </u> | | | | 28 | | | | | | |
| i ' | | | | <u> </u> | - | _ | | | | | | • | | |
| | | | | | | | | 29 | | | | | | |
| | | | | [| | _ | | 30 | | | | <u>.</u> | | |
| | | | | <u> </u> | <u> </u> | | | 30 | | | | | | |
| | | | | | - | | | 31 | | | | | | |
| | | <u> </u> | | | | | | | | , | | | ē | |
| | | | | | | | | 32 | | | | | | |
| | | | | | <u> </u> | 4 | | | | | ı | | | İ |
| | | | | | ļ | -{ | | 33 | | | | | | |
| } | | | - | | | \dashv | | 34 | | | | | | |
| [| | | | | | \dashv | | | | | | | | |
| ! | | | | | | | | 35 | | | | | | İ |
|]] | | | | | | | | | | | | | | |
| | | | | | <u> </u> | _ | | 36 | | | ļ | | | |
| | | <u> </u> | | | | 4 | | 37 | | | 1 | | | ł |
| | | | | | | | <u>[</u> | 01 | | | | | | Į |
| | | | | | | 1 | | 38 | | | | | | Ī |
| | | | | | | - | | | | | | | | ļ |
| | | | | | | 1 | | 39 | | | 1 | | |] |
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| <u> </u> | | | ! | | | | | 40 | | | L | | | |

5074 B-14-B-30 FINAL

| HAHN 434 NW Portlan | / Sixth | Avenu | | INC. | | | | so | | L BO | RING/PROBE NUMBER B-22 | |
|--|-------------------|--|--------------------|--|--|--|-----------------|--------------|-------------|--------------------|--|---------------|
| (503) 79 | - | | | | H | 1 T. | OGGEI | ₹- | | | Jason M. Greifer DRILL DRI | - |
| PROJE | | | | | + | | LING | | HO. | D. | Jason M. Greifer DRILL DRI 4' Continous Core START FINI | |
| 1 | x Marit | ime Co | mnan | v | - | | ING M | | | | Direct Push Time: Time | |
| 1 | 0 NW S | | · - | - | <u>-</u> - | | PMENT | | | · | Time . | |
| 1 | tland, (| | - | Jau | - | | LER: | | - 11 | | | |
| PROJE | |)regon | 5074 | | | | LING C | TYO | RA | CTOR: | Marcus Johnson Date: Date: Geo Tech Explorations, Inc. 24-May-01 24-Ma | |
| J | 0.2 | | | | | | | | \Box | | BORING DIAMETER: 2" | ıy-U1. |
| ABANDONMENT DETAILS | ea **: | | CE | LAB RESULT TPH-G, Total TPH Dx (ppm) | Ę | Ţ | 37 | set) | GROUNDWATER | | CASING DIAMETER: Not Applicable | |
| I EN | SAMPLE NUMBER* | 图 | PA m) | | SS | 37/ | 通じ | I (fe | M | STRATA (USCS) | SURFACE ELEVATION: Not Surveyed | |
| | M M | TIME | ADSPA (ppm) | 2 2 2 | 恩 | 筥 | COV (%) | ŢĽ | 呂 | Z S | TOP OF CASING ELEVATION: Not Applicable | |
| AN I | N S | } ~ | HEADSPACE (ppm) | | CORE/SPT | Ż | RECOVERY (%) | DEPTH (feet) | ĮŠ. | ر تع | TOP OF CASHIG ELEVATION: 1400 Applicable | |
| AE | | | H | 17. 1 | | i | , , | I | ਤਿ |] | SOIL DESCRIPTION | |
| Asphalt | | | | | | | 100 | | Г | Asphalt | Ashpalt | |
| | | ļ | | <u> </u> | | ļ | 100 | 1 | 4 | SM | Silty SAND with trace Gravel - light brown, moist, | |
| | | | | | ├ | - | 100 | 2 | | | medium dense, medium grained, poorly graded, non- | |
| | | | | | 1 | | 100 | | 1 | | plastic, no petroleum odor, sheen, or discoloration | |
| | | | | | | | 100 | 3 | | | | |
| | | 10.00 | | | <u> </u> | | 100 | | | SP | SAND - light brown, moist, loose, medium grained, | |
| | 013 | 10:30 | 2.0 | | - | _ | 100 | 4 | 1 | | poorly graded, non-plastic, no petroleum odor, sheen, | |
| | | | | | - | - | 100 | 5 | | 188 | or discoloration | |
| | | | | | | | 100 | | 1 | | | i |
| | | | | | | | 100 | 6 | 1 | | | |
| | 014 | 10:33 | 22.8 | -VND | - - | | 100 | 7 | | Company of | | |
| | 014 | 10.55 | 22.0 | -\TAT\ | ├─- | - | 100 | | | SP | SAND - as above, petroleum odor, sheen, and discoloration | |
| | | | | | Η, | 7 | 100 | 8 | | Internal Section 1 | COSCOLO ZELON | Ì |
| | | | | | | | 100 | | | | | |
| Chips | <u> </u> | | | } | <u> </u> | | 100 | 9 | | | | |
| ## ## ## ## ## ## ## ## ## ## ## ## ## | 015 | 10:38 | 8.2 | | | - | 100 | 10 | j | SP | SAND - as above, petroleum odor, sheen, and | |
| entonite | 0.10 | 10.00 | 0.2 | | <u>!</u> | | 100 | | | 72.03 | discoloration | ļ |
| M B M | | | | | | | 100 | 11 | } | | | |
| | | | | | | | 100 | | | | . | |
| | | <u> </u> | | | | | 100 | 12 | | | | - 1 |
| | | | | | | -4 | 100 | 13 | | | | ł |
| | | | | | | | 100 | | | | | İ |
| | | | | | | | 100 | 14 | | | | [|
| | | | | | | | 100 | | | 4.60 | | ļ |
| | 010 | 130.22 | 50.0 | 61.07 | | | 100 | 15 | | 新臺灣 | | Į |
| | 016 | 10:44 | 53.3 | 61.3/- | | | 100 | 16 | | SP | SAND - as above, petroleum odor, sheen, and discoloration | Į |
| | | | | | - | <u>- </u> | 100 | -10 | | | discoloration | ł |
| | | | | | | | 100 | 17 | | i dia s | | Ì |
| | | | | | | | 100 | | | | | ł |
| | | <u> </u> | | | | _ | 100 | 18 | | | | İ |
| | 017 | 10:51 | 67.0 | | | | 100 | 19 | | SP | SAND - as above, petroleum odor, sheen, and | ſ |
| | 02.1 | 20.02 | 01.0 | - | | - | 100 | -19 | | | discoloration | - { |
| | | | | | _ | | 100 | 20 | | 过滤道 | | |

5074 B-14-B-30 FINAL

| HAHN 434 NW | | | | INC. | | | | so |)II | L BO | RING/PROBE NUMBER B-22 |
|--------------------------|-------------------|----------|--------------------|--|--|----------|-----------------|--------------|-------------|------------------|--|
| Portlan | d, Oreg | on | | | | | • | | | | |
| (503) 79 | _ | | | | HA | ΙL | OGGE | R: | | | Jason M. Greifer DRILL DRILL |
| PROJE | CT: | | | | SAI | MP | LING I | MET. | но | D: | 4' Continous Core START FINISH |
| Bri | x Mariti | ime Co | mpan | y | DR | ILI | ING M | ETH | IOI |): | Direct Push Time: Time: |
| 903 | 0 NW S | t. Hel | ens Ro | oad | EQ | UII | MENT | r TY | PE | | Geoprobe 10:25 11:20 |
| Por | tland, C |)regon | | | DR | ILI | ÆR: | | | | Marcus Johnson Date: Date: |
| PROJE | CT #: | | 5074 | | DR | ILI | ING C | ТИО | RA | CTOR: | Geo Tech Explorations, Inc. 24-May-01 24-May-0 |
| Ę | | | 田 | ਵਿਤਾਰ | | | . . | | EH | | BORING DIAMETER: 2" |
| ES. | SAMPLE NUMBER* | r.a | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | I. | INTERVAL | RECOVERY (%) | DEPTH (feet) | AT | ¥ 66 | CASING DIAMETER: Not Applicable |
| NON | API fBE | TIME | ADSPA (ppm) | SES SES | E | E. | (%) | H. | 6 | SGM | SURFACE ELEVATION: Not Surveyed |
| | SA U | | A G | HHI | CORE/SPT | |) E | PT | 5 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applicable |
| ABANDONMENT DETAILS | " Z | ļ | 田 | AF | 0; | | | ā | GROUNDWATER | | SOIL DESCRIPTION |
| | _ | | <u> </u> | - | | | 100 | 21 | | SP | SAND - light brown, most, loose, medium grained, |
| | | | | | | _ | 100 | 21 | | 15 SALE 12 | poorly graded, non-plastic, petroleum odor, sheen, and discoloration |
| s S | 018 | 10:59 | 7.3 | 1.31/228 | | | 100 | 22 | | SM | |
| G. Pi | | | | | | _ | 100 | - | | | Silty SAND with trace Clay and Organics - light gray, moist, medium dense, medium grained, poorly graded, |
| uite | | <u> </u> | <u> </u> | 1 | <u> </u> | _ | 100 100 | 23 | - | | non-plastic, no petroleum odor, sheen, or discoloration |
| 3/8-inch Bentonite Chips | | | | - | | , | 100 | 24 | | CL | |
| Be | | | | | | | 100 | | 1 | | Silty CLAY - greenish-gray, moist, medium stiff, |
| inch | 019 | 11:11 | 3.7 | - | | _ | 100 | 25 | | | slightly plastic, no petroleum odor, sheen, or |
| 3/8- | | | | <u> </u> | | | 100 | 26 | | | discoloration |
| Sunny | | | | | | <u>`</u> | 100 | | | | |
| | 020 | 11:12 | 2.5 | | | _ | 100 | 27 | | SP | SAND - light brown, moist, loose, medium grained, |
| | | | | | | | 100 | 28 | | 200 | poorly graded, non-plastic, no petroleum odor, sheen, or discoloration |
| | | | | | | | : | 29 | | transmiss at the | |
| | | | | | | | | 30 | | | Groundwater not encountered |
| 1 | | | | ! | | _ | | - 00 | | | Boring terminated at 28 feet bgs Sampled to 27 feet bgs |
| | | | | | <u> </u> | _ | | 31 | | | Boring abandoned with 3/4-inch Bentonite Chips |
| | | | | | | _ | | 32 | | | |
| | | | | | | | | 33 | | | |
| | | | | | <u> </u> | \dashv | | 34 | | | |
| | | | | | | - | | 35 | | | |
| | | | | | | - | | 36 | | | |
| | | | | | | | | | | | |
| | | | | | | | | 37 | | | |
| | <u> </u> | | | 1 | | _{{ | | 38 | | <u>'</u> | |
| | | | | | | \dashv | | 39 | | | · |
| | | _ | | | | \dashv | | 40 | | | |

| HAHN & AS | a Avenu | • | INC. | | | | sc | Œ | L BO | RING/PROBE NUMBER B-23 | |
|---|--|--|--|-------------|--|-----------------|--------------|-------------|--|--|----------------------|
| Portland, Ore (503) 796-071 | - | | | TTA | T T C | OGGEI | | | ··· | Jason M. Greifer DRILL | 7 7 7 7 |
| PROJECT: | | | | | | LING I | | HO. | D. | 4' Continous Core START | |
| Brix Mari | tima C | | | | | ING M | | _ | | Direct Push Time: | |
| 9030 NW | | _ | - | | | MENI | | |) <u>. </u> | | Time: |
| | | | oad | | | | . 111 | - 17 | | | 16:34 |
| Project #: | Oregon | 5074 | | J | ILL) | | חאיי | RΑ | CTOR: | | Date: 1 24-May-01 |
| | <u> </u> | 00.1 | T | | | | | T | T'' | BORING DIAMETER: 2" | 1 24-Way-01 |
| NA STATE | | CE | p 221 | Ę. | 4 | 3.Y | et) | TE | | CASING DIAMETER: Not Applicable | |
| SANDONMEN DETAILS SAMPLE NUMBER* | 田田 | EPA III) | E T | CORE/SPT | INTERVAL | RECOVERY (%) | I (fe | W. | STRATA (USCS) | SURFACE ELEVATION: Not Surveyed | |
| OG AM | TIME | ADSPA (ppm) | | RE | E | (%) | J.T. | N | E E | TOP OF CASING ELEVATION: Not Applicable | |
| ABANDONMENT DETAILS SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | ည | 2 | RE | DEPTH (feet) | GROUNDWATER | \ \tilde{\omega} \cdot \tilde{\omega} \cdot \tilde{\omega} | TOT OF CABING BUBYATION. INCEAPPREABLE | |
| A. | <u> </u> | ш | I I | | | | | Ö | ! | SOIL DESCRIPTION | |
| Asphalt | | | | | _ | 100 | | | Asphalt | Ashpalt | |
| | - | <u> </u> | <u>!</u> | | | 100 100 | 1 | 1 | | | |
| | | | <u> </u> | \vdash | - | 100 | 2 | | 医炎藻 | ` | |
| | <u> </u> | <u>. </u> | | | | 100 | | 1 | | | |
| 036 | 15:33 | 1.3 | - | | Ţ | 100 | 3 | | SP | SAND - light brown, dry, medium dense, medium | Į. |
| | | <u> </u> | | | _ | 100 | , | | | grained, poorly graded, non-plastic, no petroleun odor, sheen, or discoloration | 1 |
| | | | | -7 | + | 100 | 4 | | 美国 | busi, sincer, or discontration | |
| | | | | | 一 | 100 | 5 | | | | |
| | | | | | | 100 | | 1 | | | |
| | | | | | _ | 100 | 6 | 1 | 49.0 | | |
| 037 | 15:35 | 1.9 | | \vdash | \dashv | 100 | 7 | | SP | SAND - as above, no petroleum odor, sheen, or | |
| | 1 | | | | 十 | 100 | | | | discoloration | |
| | | | | v | , [| 100 | 8 | ļ | | | |
| E 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | | | | | _ | 100 | _ | i | | | |
| nch Bentonite Chips | - | i 1 | | | ᆉ | 100 | 9 | | | | |
| (# M) | + | <u> </u> | | | - | 100 | 10 | | 数字章 | | |
| l of life | | | | | | 100 | | | | GAND and have a material and a decided | |
| B 038 | 15:40 | 1.0 | | | | 100 | 11 | | SP | SAND - as above, no petroleum odor, sheen, or discoloration | į |
| | - | | | | , | 100 100 | 12 | | 144 | | |
| | | | | Y | + | 100 | | | | | |
| | ╅ | | | | | 100 | 13 | | | | |
| | | | | | $\Box T$ | 100 | | | | | |
| | | | | | _ | 100 | 14 | | | | |
| 039 | 15:51 | 0.2 | | | | 100 | 15 | | | SAND - as above, no petroleum odor, sheen, or | |
| 111111111111111111111111111111111111111 | 19:97 | U.Z | | | -+ | 100 | LU | | SP | discoloration | |
| | + | · | | - | , | 100 | 16 | | | | |
| | | | | | | 100 | | | | | |
| | | | | I | _[| 100 | 17 | | | | |
| | | | <u> </u> | | _ | 100 | 10 | | | | ļ |
| | ' | | <u> </u> | }- | + | 100 | 18 | | | CIANTO | j |
| 040 | 16:00 | 1.6 | - | + | + | 100 | 19 | | SP | SAND - as above, no petroleum odor, sheen, or discoloration | |
| | | | | | <u> </u> | 100 | | | | - Thomas and the second | |
| | | | | | Ţ | 100 | 20 | | | | |

| 434 NV | & ASS V Sixth . | Avenu | | INC. | | | | so | ŊΠ | L BO | RING/PROBE NUMBER | B-23 | i |
|--------------------------|--------------------|----------------|-----------------------------|--|----------------------|--------------|-----------------|--------------|-------------|--------------------|--|-------------|-----------|
| | 96-0717 | | | | <u> </u> | TT. | OGGE | R· | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | - | | LING | | HO: | D· | 4' Continous Core | START | FINISH |
| 1 | x Mariti | ime Co | מפתתנ | v | \vdash | | LING M | | | | Direct Push | Time: | Time: |
| į. | 30 NW S | | - | _ | | | PMEN | | | | Geoprobe | 15:42 | 16:34 |
| 1 | tland, C | | | | \vdash | | ER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | | ~ - 65 | 5074 | | | | LING C | TNO | RA | CTOR: | Geo Tech Explorations, Inc. | ł | 24-May-01 |
| E | | | - | | | | | | H. | | BORING DIAMETER: 2" | · | |
| SEN | 田益 | | CE | OL. | CORE/SPT | ΑĽ | RY | DEPTH (feet) | ATF | 4 | CASING DIAMETER: Not Applica | able | |
| A SE | PL | TIME | (ppm) | ESS T. X | | RV. | OVE (%) | H (f | DW. | AT SS | SURFACE ELEVATION: Not Survey | | |
| DE | SAMPLE NUMBER* | TI | \$ \$ | HHC | E | | RECOVERY (%) | | 5 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applica | | |
| ABANDONMENT DETAILS | l ∞ ⊠ | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | ರ | Z | 器 | DE | GROUNDWATER | ω, - | | | |
| <i>~</i> | | | ļ · · · · | | Ļ., | , | | <u> </u> | В | int Summer con com | SOIL DESCRIPTION | | |
| | | - | - | <u> </u> | - | _ | 100 | 21 | | SP | SAND - light brown, dry, medium dense, | | |
| | | | <u> </u> | ! | ! | - | 100 | 1 21 | 1 | | grained, poorly graded, non-plastic, no p odor, sheen, or discoloration | errotemu | |
| 8 8 | | | | | | | 100 | 22 | | Mark. | ,, | | |
| 3/8-inch Bentonite Chips | | 70.10 | 10 | NTD OTT | <u> </u> | | 100 | | | e file | | | |
| ite | 041 | 16:10 | 1.6 | ND/ND | 1 | - | 100 | 23 | 1 | min | | | |
| aton (%) | - | | | | | 7 | 100 | 24 | | CL | Silty CLAY - gray, moist, medium stiff, si plastic, no petroleum odor, sheen, or disc | | |
| Be N | | | | | | | 100 | | | | plastic, no petroleum duor, sneen, or disc | otoration | |
| Deh | | | <u> </u> | <u> </u> | <u> </u> | | 100 | 25 | | | | | |
| 88 3 | - | - | - | | \vdash | - | 100 | 26 | | | | | |
| Bunnel | | ļ | İ . | | | | 100 | | 1 | | | | į |
| | 042 | 16:22 | 0.3 | <u> -</u> | | | 100 | 27 | 1 | CL | Silty CLAY - as above, no petroleum odo | r, sheen, o | r |
| | | | | <u> </u> | | | 100 | 28 | | | discoloration | | i |
| 100000 | | - | | | | | | | | | | | |
| 1 | | | | | | | | 29 | | | Groundwater not encountered | | |
| | | | | | <u> </u> | | | 30 | | | Boring terminated at 28 feet bgs Sampled to 27 feet bgs | | |
| | | | | | E | | | 31 | | | Boring abandoned with 3/4-inch Bentoni | te Chips | |
| | | | | | | | | 32 | | | | | |
| | | | | | | | | 33 | | | | | |
| | | | | | _ | | <u> </u> | 34 | | | | | |
| | | | | | | | | 35 | | | | | |
| | | | | | | | | 36 | | | | | |
| | | - | | | | - | | 37 | | | | | |
| | | | | | | 1 | | 38 | | | | | |
| | | | | | | | | | | | | | Ì |
| | | | <u> </u> | | <u> </u> | | | 39 | | | | | |
| L | I | - | | | 1 | i | # | 40 | · | | | | } |

| SOIL BORING/PROBE NUMBER B-24 | HAHN | & ASS | OCIA | TES. | INC. | Τ_ | | | | | | | | |
|--|-------------|-------------|---------------|----------------|--|--------------|----------|-------------|----------|-----|---------|--|-------------|-----------|
| SAND Sand | 1 | | | • | _,_, | | | | SC |)]] | L BO | RING/PROBE NUMBER E | 3-24 | |
| PROJECT: START S | Portlan | d, Oreg | оп | | | 1 | | | | _ | | | | |
| PROJECT | (503) 7 | 96-0717 | | | | HA | ΙL | OGGEI | ₹: | | | Jason M. Greifer | DRILL | DRILL |
| Solid Provided P | PROJE | CT: | | | | SA | MP | LING I | /ET | HO: | D: | 4' Continous Core | START | FINISH |
| Portland, Oregon | Bri | x Marit | ime Co | отрал | y | DR | ILI | ING M | ETH | IOL |): | Direct Push T | ime: | Time: |
| PROJECT 6: 5074 DRILLING CONTRACTOR Geo Tech Explorations, Inc. 225-May-01 25-Ma | 903 | o NW S | t. Hel | ens Ro | oad | EQ | ווט | PMENT | TY | PE | | Geoprobe | 8:09 | 9:26 |
| BORING DIAMETER: 2" CASING DIAMETER: Not Applicable SURFACE ELEVATION: Not Applicable SURFACE SURFAC | Por | tland, C | regon | ι | | | | | | | | | ate: | Date: |
| Application Part | PROJE | CT #: | · | 5074 | · | DR | ILI | ING C | ONT | 'RA | CTOR: | <u></u> | 5-May-01 | 25-May-01 |
| Asphalt 100 100 1 100 1 100 1 1 | Į Į | | } | 日 | 三 一 日 | _ | , | این | t) | 品 | | BORING DIAMETER: 2" | | |
| Asphalt 100 100 1 100 1 100 1 1 | ME | EE FE | F÷1 | AC C | Tot Id | M | ÆΙ | ER | (fee | VAT | ₹6 | CASING DIAMETER: Not Applicable | le | |
| Asphalt 100 100 1 100 1 100 1 1 | PAL | MP ABE | N N | [첫 E | 日 で う で う で う で | 層 | SR\ | (%) | H. | | SC. | SURFACE ELEVATION: Not Surveyed | l | |
| Asphalt 100 100 1 100 1 100 1 1 | DE DE | SAI | E | Αğ. | BH. | ğ | N | EC | EP | 5 | | TOP OF CASING ELEVATION: Not Applicabl | le | |
| Asphalt | ABA | 2 | | | A E E | | Π | æ | 百 | GE | | SOIL DESCRIPTION | | |
| 100 100 2 100 3 100 3 100 4 100 4 100 5 100 4 100 5 100 5 100 5 100 | Asphalt | | | | | | | | <u> </u> | - | Asphalt | | | |
| SAND - brown, moist, medium dense, medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration SAND - brown, moist, medium dense, medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration | | | | <u> </u> | | | | | 1 | 4 | | | | |
| SAND - brown, moist, medium dense, medium grained, poorly graded, non-plastic, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration | | | | | | - | | | 2 | | | | | |
| 043 8:16 23.8 - 100 3 100 4 100 4 100 4 100 4 100 5 100 6 100 6 100 6 100 6 100 6 100 6 100 6 100 6 100 6 100 | | | | | | - | | <u> </u> | | 1 | | SAND - brown moist medium dense medi | ium | |
| 100 | | 043 | 8:16 | 23.8 | - | | | | 3 | | SP | | | |
| 100 | | | | <u> </u> | <u> </u> | | | | , | | | | | |
| 100 5 100 6 100 7 100 7 100 7 100 7 100 7 100 8 100 10 | | | | | <u> </u> | | | | 4 | 1 | | | | |
| 100 6 100 7 100 7 100 8 100 8 100 9 100 10 100 10 100 10 1 | | | | | | | | | 5 | | 4.04 | | | |
| SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration | | | | | | | | | | | | | | |
| O44 8:26 47.1 - 100 7 100 8 100 10 | | | ļ | | | _ | | | 6 | | | | | |
| 100 8 100 9 100 10 100 10 100 10 1 | | 044 | 8:26 | 47.1 | | | - | <u> </u> | 7 | | SP | | n, or | |
| SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration SAND - as above, no petroleum odor, sheen, or discoloration | | | | <u> </u> | | | | | | 1 | | discoloration | | |
| 100 9 100 | | | | | <u> </u> | | | | 8 | | | | | |
| 100 | | | - | - | | - | | | 9 | | | | | |
| SAND - as above, no petroleum odor, sheen, or discoloration 100 | 05 <i>}</i> | | | | | | | | | 1 | 7 Ta | | | |
| O45 8:33 42.9 - 100 11 SP discoloration | | | | | | | | 100 | 10 | | | | | |
| 100 | | | 2.00 | 100 | | | | | | | SP | | n, or | |
| 100 12 100 13 100 14 100 14 100 14 100 14 100 15 100 15 100 16 100 17 100 18 100 | M P. S | 045 | 8:33 | 42.9 | | | <u> </u> | | 11 | | | discoloration | | ļ |
| 100 | | | | | | | , | | 12 | | | | | |
| 100 | | | | | | | ĺ | | | 1 | 2.3 | | | |
| 100 14 14 15 100 15 100 15 100 15 100 16 100 17 100 18 100 1 | Umille | | | | | | | | 13 | | | | | |
| 100 | | | | | | | - | | 14 | | | | | |
| 046 8:40 41.8 | | | | | | ┝╌┤ | | | 14 | | | SAND, as above no notreleum odou -bo- | .n. c= | |
| 100 | | 046 | 8:40 | 41.8 | _ | | | | 15 | | SP | | u, or | |
| 100 17 100 17 100 18 100 1 | | | | | | | | | | | | | | |
| 100 17 25 100 18 100 19 100 19 100 19 100 | | | | | | ¥ | ' | | 16 | | | | | i |
| 100 18 100 19 100 19 100 19 100 19 100 19 100 19 100 19 100 100 | | | | | | | - | | 17 | | | | | |
| 100 18 100 19 047 8:49 19.3 - 100 19 | | | | | | | + | | 1.6 | | | | | |
| 047 8:49 19.3 - 100 19 3 de 3 | | | | | | | | | 18 | | | | | |
| 100 | | | | | | | | | | | | | | f |
| | | 047 | 8:49 | 19.3 | | | - | | 19 | | | | | 1 |
| | | | | | | | , | | 20 | | | | | İ |

5074 B-14-B-30 FINAL

| HAHN | & ASS | OCIA | TES. | INC. | 1 | | | | | | | |
|--------------------------|-------------------|---------------|--------------------|--|--|--------------|--------------|-------------|--------------------|---|-------------|-----------|
| 434 NW | | | | | | | SC | | L BO | RING/PROBE NUMBER | B-24 | |
| Portlan | d, Oreg | on | | | 1 | | _ | _ | | | | |
| (503) 79 | 96-0717 | | | | HAI Ì | LOGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SAM | PLING | MET | но | D: | 4' Continous Core | START | FINISH |
| Bri | x Mariti | ime Co | mpan | y | DRIL | LING M | ŒTE | IOI | D: | Direct Push | Time: | Time: |
| 903 | o wws | t. Hel | ens Ro | ad | EQU | PMEN' | r TY | PΕ | | Geoprobe | 8:09 | 9:26 |
| Por | tland, C | regon | | | DRIL | | | | | Marcus Johnson | Date: | Date: |
| PROJE | CT #: | | 5074 | : | DRIL | LING C | CNO | RA | CTOR: | Geo Tech Explorations, Inc. | 25-May-01 | 25-May-01 |
| Ę | | | 闰 | [탁급급 | ١ ₋ , | | 3 | ER | 1 | BORING DIAMETER: 2" | | |
| WE LS | SAMPLE NUMBER* | r¥1 | HEADSPACE (ppm) | Tota Ppr | CORE/SPT INTERVAL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ₹66 | CASING DIAMETER: Not Applic | able | |
| No. 1 | MP. | TIME | ADSPA (ppm) | 高 元 兴 | E E | § § | H | ě | STRATA (USCS) | SURFACE ELEVATION: Not Survey | yed | |
| | SAI | Ξ | A D | 四年日 | lo E | DE C | FF | É | | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | 2, | | E | LAB RESULT TPH-G, Total TPH Dx (ppm) | O E | E | Ä | GRO | <u> </u> | SOIL DESCRIPTION | | |
| | | | | ļ | | 100 | | | SP | SAND - dark gray, moist, medium dense | . medium | |
| | | <u> </u> | <u> </u> | 1 | - | 100 | 21 | 1 | | grained, poorly graded, non-plastic, no | | |
| | | - | | | | 100 | 22 | | | odor, sheen, or discoloration | | |
| 3/8-inch Bentonite Chips | | | | | | 100 | | 1 | 10.5 | | | |
| | | | 20.5 | 12770777 | - | 100 | 23 | 4 | 777777 | | | |
| (to () | 048 | 9:12 | 26.1 | ND/ND | | 100 |] 24 | | CL | Silty CLAY - light gray, very moist, med | | |
| | | | <u>!</u> | | | 100 | 23 | 1 | mini in the second | slightly plastic, no petroleum odor, sheer discoloration | n, or | |
| | | | | | | 100 | 25 | | | discontant | | |
| 8 % II | | | | | \vdash | 100 | | | | | | |
| | | | - | | | 100 | 26 | | | | | |
| | 049 | 9:21 | 15.8 | ND/ND | | 100 | 27 | | CL | Silty CLAY - as above, no petroleum odor | r, sheen, o | r |
| | | | | | | 100 | 28 |] | | discoloration | | : |
| | | | | | <u> </u> | 100 | | | | Groundwater not encountered | | |
| } | | | <u> </u> | - | <u> </u> | | 29 | } | | GIOGIAWARCI HOU CHEOGIALEFEA | | |
| | | | | | | | 30 | | | Boring terminated at 28 feet bgs. Sampled to 27 feet bgs | | |
| | | | | | <u> </u> | | 31 | | | Boring abandoned with 3/4-inch Benton | ite Chips | |
| | | | | | | <u> </u> | 32 | | | | | |
| | | | | | | | | 1 | | | | |
| | <u> </u> | | | | | | 33 | | | | | ĺ |
| | | | | | | | 34 | | | , | | |
| | | | | | | | 35 | | | | | |
| | | | | | | | 36 | | | | | |
| | | | | | | | 077 | | | | | |
| | | | | | | | 37 | | | | | |
| | | | | | | | 38 | i | | | | } |
| | | | | | | | 39 | | | | | |
| | | | | | | | 40 | | | | | |

| HAHN 434 NW Portlan | Sixth. | Avenu | | INC. | | | | sc | —— OD | L BO | RING/PROBE NUMBER B-25 |
|---------------------------|-------------------|--|-----------------|--|----------------|----------|-----------------|--------------|-------------|------------------|--|
| (503) 79 | 6-0717 | | | | HA | ΊL | OGGEI | R: | | | Jason M. Greifer DRILL DRILL |
| PROJE | CT: | | | | SA | МР | LING I | VET: | HO | D: | 4' Continous Core START FINIS |
| Briz | k Marit | ime Co | mpan | y | DR | ILI | LING M | ETF | IOL |): | Direct Push Time: Time: |
| 903 | o nw s | st. Hele | ens Ro | ad | EQ | (III | PMENT | TY. | PE | | Geoprobe 17:00 9:26 |
| Por | tland, C | regon | | | DR | ILI | ER: | | | | Marcus Johnson Date: Date: |
| PROJE | CT #: | | 5074 | | DI | ILI | LING C | ONT | RA | CTOR: | Geo Tech Explorations, Inc. 25-May-01 25-May- |
| Ę | | ļ | · E3 | E = 3 | 1 | | | 3 | 器 | } | BORING DIAMETER: 2" |
| E S | 목 | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | 딦 | INTERVAL | RECOVERY (%) | DEPTH (feet) | A | ₹ 55 | CASING DIAMETER: Not Applicable |
| ON | SAMPLE NUMBER* | TIME | ADSPA (ppm) | SES C, 7 X | CORE/SPT | JRV | OVI (%) |)H | In the | STRATA (USCS) | SURFACE ELEVATION: Not Surveyed |
| SE | SA. | E | A G | | 18 | E. |) | PT | Ę | | TOP OF CASING ELEVATION: Not Applicable |
| ABANDONMENT DETAILS | 51 Z | | HE | AT F | 0 | Ħ | ES . | ă | GROUNDWATER | | SOIL DESCRIPTION |
| Asphalt | | | | | | | 100 | | | Asphalt : | Ashpalt |
| | | | | | | | 100 | 1 | 1 | SP | SAND - light brown, dry, medium dense, medium |
| | | <u></u> | | <u> </u> | - | - | 100 | 2 | | 2000 CO | grained, poorly graded, non-plastic, no petroleum |
| | | <u> </u> | | | <u> </u> | | 100 | | 1 | | odor, sheen, or discoloration |
| | | | | | | | 100 | 3 | | 76. | |
| | 077 | 16:01 | 0.4 | ļ <u>.</u> | <u> </u> | _ | 100 100 | | 1 | | |
| | 011 | 10.01 | 0.4 | - | | | 100 | 4 | 1 | talence state | |
| | | | | | | | 100 | 5 | | | Silty SAND - light gray, dry, medium dense, medium |
| | | | | 2 - 2 - | | | 100 | |] | SM | grained, poorly graded, non-plastic, no petroleum |
| | 078 | 16:05 | 0.6 | ND/ND | - | | 100 | 6 | 1 | | odor, sheen, or discoloration |
| | | | | | - | | 100 | 7 | | | |
| | | | | | | | 100 | | 1 | SP | SAND - light gray, dry, medium dense, medium |
| | | <u> </u> | | | | | 100 | 8 | | 423.029 | grained, poorly graded, non-plastic, no petroleum |
| Chips | | | | | | | 100 100 | 9 | | 海流 | odor, sheen, or discoloration |
| ØŞ∭ | | | | | | | 100 | | 1 | | · |
| entonite | 079 | 16:11 | 0.9 | - | | | 100 | 10 | | | · |
| | | | | | | | 100 | | | | |
| | | <u> </u> | | • | - | \vdash | 100 | 11 | } | SP | SAND - as above, no petroleum odor, petroleum |
| -inch Be | 080 | 16:12 | 1.1 | ND/ND | 1 | | 100 | 12 | | | sheen, no discoloration |
| 08 % | | | | | | | 100 | | | | |
| Umill | | | | | | | 100 | 13 | | | |
| | | | | | | | 100 | 14 | | | |
| | | | | | - | - | 100 | 7.4 | | | |
| | | | | - | | | 100 | 15 | | | |
| | | | | | | | 100 | | | SP | SAND - as above, no petroleum odor, petroleum |
| | 081 | 16:15 | 0 | - | | 7 | 100 | 16 | | 400014 | sheen, no discoloration |
| | | | | · | \vdash | _ | 100 | 17 | | SM | Silty SAND - light gray, dry medium dense, medium |
| | | | | i | \dashv | + | 100 | Τ/ | | | grained, poorly graded, non-plastic, no petroleum |
| | | | | | | \dashv | 100 | 18 | | | odor, sheen, or discoloration |
| | | | | | | | 100 | | | SP | SAND - light gray, dry, medium dense, medium |
| | | | | i | | \dashv | 100 | 19 | | | grained, poorly graded, non-plastic, no petroleum |
| | 082 | 16:28 | 0.7 | | - 1 | , | 100 | 20 | | | odor, sheen, or discoloration |

5074 B-14-B-30 FINAL

| L . | & ASS | | • | INC. | T | | | ~. | - | | | | |
|--------------------------------|-------------------|-------------|--------------------|--|--|----------------|------------|--------------|-------------|------------------|--|--------------------|--------------|
| | V Sixth . | | e | | | | | SC |)]] | L BO | RING/PROBE NUMBER | \mathbf{B} -25 | |
| | id, Oreg | on | | | - | | | | | | | T | |
| | 96-0717 | | | | | LOG | | | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | - | VPLII | | | | | 4' Continous Core | START | FINISH |
| Ī | x Mariti | | _ | - | <u> </u> | LLIN | | | |): | Direct Push | Time: | Time: |
| 1 | NW S | | | ad | 1 | UIPM | | TYP. | <u>- 15</u> | | Morana Tahasaa | 17:00 | 9:26 |
| PROJE | tland, C | regon | 5074 | <u> </u> | | LLEI | | ONT | RA | CTOR: | Marcus Johnson Geo Tech Explorations, Inc. | Date: 25-May-01 | Date: |
| | | | | | | | <u> </u> | | | 1 | BORING DIAMETER: 2" | 20 41247 02 | Zo-May-OI |
| E S | E * & | | CE | LAB RESULT TPH-G, Total TPH Dx (nnm) | <u> </u> | KY RY | 1 | DEPTH (feet) | ATE: | | CASING DIAMETER: Not Applie | able | |
| ALE A | PL | TIME | ADSPA (ppm) | EST. | | Ž ₹ | (%) | (£) | NE NE | ATZ CSS | SURFACE ELEVATION: Not Surve | | |
| | SAMPLE NUMBER* | TII | HEADSPACE (ppm) | H. H. | CORE/SPT | INTERVAL | క్ర | FI | E | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applic | | |
| ABANDONMENT DETAILS | ᄧᄝ | | H | LAB RESULT TPH-G, Total TPH Dx (nnm) | ŏ | | | 田田 | GROUNDWATER | ω2 - | | | |
| <i>11111111</i> | | | | <u> </u> | | | 100 | | - | 580478690 | SOIL DESCRIPTION | | |
| tunil. | | | <u> </u> | | ++ | | 100 | 21 | | | SAND - light gray, moist, medium dens | se. medium | ì |
| 3/8-inch Bentonite Chips | | | | | | | 100 | | 1 | SP | grained, poorly graded, non-plastic, pet | roleum odo | r |
| の音響 | | <u></u> . | | | ╬╬ | ~ _ | 100 100 | 22 | - | | and sheen, no discoloration | | |
| Sag S | 083 | 16:46 | 154 | - | ++ | | 100 | 23 | | | | | |
| Conne | | | | | | | 00 | | 1 | | Silty CLAY - light gray, very moist, med | lium stiff. | |
| | | | | | ┿ | 1 | .00 | 24 | _ | CL | slightly plastic, slight petroleum odor, n | | |
| i | | | | | | - | | 25 | | ĺ | discoloration | | |
| | | | | | Ţ- | | | 26 | | | Groundwater not encountered | | |
| 1 | | | | | | | | | | | Boring terminated at 24 feet bgs | | |
| I | | | | | ┼ | | | 27 | | ļ | Sampled to 23 feet bgs | | |
| | | | | | - | _ | | 28 | | | Boring abandoned with 3/4-inch Benton | ite Chips | |
| Ì | | | | | | \perp | | | | | | | |
| | | <u> </u> | | | | <u> </u> | | 29 | | | | | |
| | | | | | + | _ | \dashv | 30 | | | · | | |
| | | | | | | | \Box | 31 | | | | | |
| | | | | <u> </u> | | + | | 31 | | | | | |
| 1 | | | | | <u> </u> | | | 32 | | | | | |
| | | | | | ┼ | - | | 33 | | | | | |
| | | | | | - | | | - 33 | | | | | |
| | | | | | | | | 34 | | | | | |
| | · | | | ļ | ┼ | | | 0.5 | | ! | | | |
| | | | | | + | | | 35 | | | | | |
| | | | | | <u> </u> | | | 36 | | | | | |
| | | | | | - | - | | 37 | | | | | |
| <u> </u> | | | | | + | - | | - 31 | | | | | |
| | | | | | | | | 38 | | ; | | | |
| | | | | <u> </u> | - | - | | 39 | - } | | | | |
| | | | <u></u> | | | +- | | _59 | | | | | |
| | | | | | | - | | 40 | | ļ | | | ļ |

| HAHN | | | _ | INC. | | | | ~ | | | | ~ | |
|------------------------|-------------------|--|--------------------|---|----------|-----|-----------------|--------------|--------------|------------------|---|-------------|-----------|
| 434 NW | 7 Sixth . | Avenu | ie | | | | | SU |)11 | LBO | RING/PROBE NUMBER | B-26 | i |
| Portlan | , - | | | | | | | | | | | | · |
| (503) 79 | 96-0717 | | | | HA | ΙL | OGGEI | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SA | MP | LING I | (ET | HO. | D: | 2' Continous Core | START | FINISH |
| Bri | x Marit | ime Co | ompan | У | DR | ILI | ING M | ETH | IOI |): | Direct Push | Time: | Time: |
| 903 | 0 NW S | it. Hel | ens Ro | ad | EQ | UU | PMENT | TYT. | PE | | Roto-hammer | 10:01 | 13:46 |
| Por | tland, C |)regon | · | | | | ER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | CT #: | | 5074 | | DR | ILI | ING C | ONT | 'RA | CTOR: | Geo Tech Explorations, Inc. | 25-May-01 | 25-May-01 |
| Ę | | | 田 | E = 0 | | | 7 | ا ا | 開 | | BORING DIAMETER: 2" | | |
| ME] | SAMPLE NUMBER* | | HEADSPACE (ppm) | Pots Ppu | CORE/SPT | AL | RECOVERY (%) | DEPTH (feet) | 1 | 45 | CASING DIAMETER: Not Applic | able_ | |
| ON | I E I | TIME | ADSPA (ppm) | (A) (A) (A) (A) (A) (A) (A) (A) (A) (A) | 图 | iRV | (%) | H. | D. | Z Z | SURFACE ELEVATION: Not Survey | red. | |
| QN G | AN TO | | A G | HH | 8 | VTE |) EC(| PT | | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | "Z | | H | LAB RESUL/T TPH-G, Total TPH Dx (ppm) | | II. | E | Ä | GROUNDWATER | | SOIL DESCRIPTION | | |
| conctrete | | | <u> </u> | | | | 100 | | | Concrete | Concrete floor 4.0" | | · |
| William . | | | | | | | 100 | 1 | 1 | GW | Gravel - brown, dry, medium dense, poor | ly graded. | |
| | 051 | 10:07 | 0.6 | <u> </u> | <u> </u> | | 100 | , | | 主義權 | non-plastic,no petroleum odor, sheen, o | r | |
| | 091 | 10:07 | 0.6 | <u> </u> | | | 100 | 2 | 1 | | SAND - light brown, dry, loose, medium | grained. | |
| | | | - | <u> </u> | | | 100 | 3 | | SP | poorly graded, non-plastic, no petroleun | | een, |
| | | | | | | | 100 | | 1 | | or discoloration | | |
| | 552 | 10:20 | 1.3 | - | | | 100 | 4 | 1 | SM | Silty SAND - light gray, dry medium de | nse, mediu | ım. |
| | | ļ | <u> </u> | | - | | 100 | 5 | | 100 | grained, poorly graded, non-plastic, no | petroleum | |
| | | | | ! | <u>.</u> | | 100 | - | - | P. (*) | odor, sheen, or discoloration | | |
| | 053 | 10:40 | 2.1 | ND/1,820 | | , | 100 | 6 | | , SP | | | |
| | | | | | | | 100 | | } | | SAND - dark gray, dry, loose, medium g graded, non-plastic, no petroleum odor, | | orly |
| | | | | | - | _ | 100 | 7 | | 200 | discoloration | sucen, or | - |
| | 054 | 11:06 | 3.9 | - | | 7 | 100 | 8 | | | | | |
| | | | | | | | 100 | | [| 100 | | | 1 |
| antonite Chips | | | | | | | 100 | 9 | | | | | - |
| | 055 | 11:19 | 3.2 | | | | 100 | 10 | } | | | |] |
| | บออ | 11,13 | 0.4 | | | | 100 | 10 |] . | SP | SAND - dark gray, dry, loose, medium gr | | |
| | | | ļ | | | | 100 | 11 | | 12,531 | graded, no petroleum odor, sheen, or dis | coloration | |
| | | | | | | | 100 | | | 2.7 | | | } |
| 3/8-inch Ber | 056 | 11:36 | 3.0 | <u> </u> | | | 100 | 12 | | | | | |
| \mathbb{Z}_{ω} | | | | | | | 100 | 13 | | | | | |
| | | | <u> </u> | | | | 100 | TO | } | | | | |
| | 057 | 11:51 | 4.2 | _ | 1 | , | 100 | 14 | | SP | SAND - as above, no petroleum odor, she | en, or | Ī |
| | | | | | | | 100 | | | rant-ratio | discoloration | • | |
| | | | | | | | 100 | 15 | | | | | |
| | 058 | 12:07 | 10 | | | | 100 | 10 | | | | | 1 |
| | UD5 | 12:07 | 4.6 | | | | 100 | 16 | | 40.47 | | | ł |
| | | | | | | { | 100 | 17 | | | | | Ì |
| | | | | | | _ | 100 | | | | | | Į |
| MIIII | 059 | 12:27 | 13.4 | ND/ND | _ 🔻 | 7 | 100 | 18 | | ŠP | SAND - as above, slight petroleum odor, | no sheen o | or |
| | | | | 100 discolation | | | | | | | | | [|
| | | <u> </u> |] | | -+ | | 100 | 19 | | | | | j |
| | 060 | 12:48 | 8.5 | | - 1 | , | 100 | 20 | | | | | Ī |
| التنتيبي | | | | | <u> </u> | | | | لببا | | <u> </u> | | |

5074 B-14-B-30 FINAL

| | & ASS V Sixth | | | INC. | | | | sc |) [] | L BO | RING/PROBE NUMBER | B-26 | |
|--------------------------------|-------------------|--------------|--|--|---------------|-------------------|--|--------------|------------------------------|------------------|---|----------------|-------------|
| ľ | ıd, Oreg | | | | | | | | | <u></u> | | | |
| (503) 7 | 96-0717 | <u></u> | | | | HAI J | LOGGEI | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | | SAMI | PLING I | METI | HO! | D: | 2' Continous Core | START | FINISH |
| Bri | x Mariti | ime Co | mpan | ıy |] | DRIL | LING M | ŒTH | IOL |); | Direct Push | Time: | Time: |
| 903 | 30 NW S | t. Hele | ens Ro | ad | 7 | EQUI | IPMENT | ŗ TYŦ | PE | | Roto-hammer | 10:01 | 13:46 |
| | tland, C |)regon | | | | DRIL | | | | | Marcus Johnson | Date: | Date: |
| PROJE | CT #: | | 5074 | Γ | | DRIL | LING C | 7 | | | Geo Tech Explorations, Inc. | 25-May-01 | 25-May-01 |
| ABANDONMENT DETAILS | * | | 胃 | ta i | (ii) | 卢나 | | £ | GROUNDWATER | 1 | BORING DIAMETER: 2" | 11 | |
| NIMI | SAMPLE NUMBER* | 图 | EAC E | DS of | <u>g</u>] | γV. | RECOVERY (%) | (fe | WA' | STRATA (USCS) | CASING DIAMETER: Not Applie | | |
| DOJ | IME | TIME | ADSPA (ppm) | HO | Dx | REFERENCE | (%) | HT | S | USC | SURFACE ELEVATION: Not Surve | | |
| MAN | SA | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total | TPH Dx (ppm) | CORE/SPT INTERVAL | RE(| DEPTH (feet) | Ω | ŞΣ | TOP OF CASING ELEVATION: Not Appli | cable | |
| 1000000 | | | 14 | Н | | | | | ਹ | | SOIL DESCRIPTION | 4 | |
| gmill | | | ├ | - | - | - | 100 | 21 | | SP | Silty CLAY - light gray, wet, medium st | tiff, slightly | 7 |
| 3/8-inch Bentonite Chips | | | <u> </u> | | \exists | 士 | 100 | 7 | $\stackrel{\bullet}{\nabla}$ | | plastic, slight petroleum odor, no sheen | | |
| 建製 | 061 | 13:09 | | ND/N | Ē | * | 100 | 22 | 4 | CL | discoloration | | |
| E B | ļ | | <u> </u> | _ | -+ | | 100 | 23 | , | | 4 | | |
| Gunn B | J | | | | | - | 100 | 1 | 1 | | | | |
| | 062 | 13:28 | 0.1 | | | ¥ | 100 | 24 | | SP 8 | | | |
| | | | <u> </u> | - | | | | 25 | | | graded, non-plastic slight petroleum of or discoloration | ior, no she | en |
| | | <u> </u> | <u> </u> | 1 | | | + | 1 20 | } | | or asserting | | |
| | | | | | + | | + | 26 | 4 | | Groundwater not encountered | | |
| 1 | | | | | + | | | 27 | / | | Boring terminated at 24 feet bgs | | |
| ļ | | | | | \Box | | | | 1 ' | | Sampled to 24 feet bgs | | |
| | | 1 | | | | | | 28 | | | Boring abandoned with 3/4-inch Bento | nite Chips | |
| | <u> </u> | | <u> </u> | | 1 | | + | 29 | , | | 1 | | |
| | | | | | \supset | | | | 1 | | _ | | |
| | <u> </u> | | | | -+ | | | 30 | 4 / | | Ì | | |
|] | <u> </u> | | | | 1 | | | 31 | .[| | | | |
| | | | | | \Box | | | |]] | | | | |
| | | <u> </u> | <u></u> | <u>} </u> | | | - | 32 | | | | | |
| | | | | | \Rightarrow | | | 33 | | | | | |
| | - | | | <u> </u> | + | | | 34 | | | | | İ |
| | | | | | 二 | | | | | | | | |
| | | - | | <u> </u> | - | | | 35 | | | | | ļ |
| | | | | | 1 | | | 36 | | | | | |
| | | | | | \Box | | | | | | | | |
| 1 | <u> </u> | | | | | | | 37 | 1 1 | 1 | | | |
| | | | | | + | | | 38 | | İ ' | | | |
| | | | | | \Box | | | | 1 1 | | | | |
| | | | | <u> </u> | <u> </u> | | + | 39 | | i | | | |
| } | | | | | + | | | 40 | | { | | | |

5074 B-14-B-30 FINAL

| | 0 400 | OCTA | mac : | | | | | | | | | - |
|------------------------|-------------------|----------|--------------------|--|--|-----------------|--|-------------|------------------|--|-------------|---------------|
| HAHN | | | • | INC. | | | 90 | \T T | DO: | DINICIONADIO NITIMOND | D 05 | |
| 434 NW | | | ıe | | | | S | ונוע | L BU. | RING/PROBE NUMBER | B-27 | |
| Portlan | | | | | | | | | | | | |
| (503) 79 | 96-0717 | | | | HAI I | OGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SAME | LING 1 | MET. | HO! | D: | 3 ounce Stainless Steel Scoop | START | FINISH |
| Bri | x Mariti | ime C | ompan | . y | DRIL | LING M | ŒTI | IOD |): | Post Hole Digger | Time: | Time: |
| 903 | 0 NW S | t. Hel | ens Ro | ad | EQUI | PMEN | יציד יו | PΕ | | Post Hole Digger | 10:00 | 11:39 |
| Por | tland, C | regor) | L | | DRILI | LER: | | | | Jason M. Greifer | Date: | Date: |
| PROJE | | | 5074 | | DRIL | LINGC | INO | 'RA | CTOR: | Hahn and Associates, Inc. | | 25-May-01 |
| F | | | | E - 0 | | | | æ | | BORING DIAMETER: 2" | | |
| | 田 卷 | | Ö | p otal | [; | RY | eet, | | | CASING DIAMETER: Not Applie | able | |
| | PL | Œ | E E | 15 H 3 | | OVE (%) | (£) | × | A SS | SURFACE ELEVATION: Not Surve | | |
| | SAMPLE NUMBER* | TIME | ADSPA (ppm) | | | 000 | ĮŢ. | 层 | STRATA (USCS) | TOP OF CASING ELEVATION: Not Applie | | |
| ABANDONMENT DETAILS | S E | _ | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT INTERVAL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ر ين ا | TOP OF CABING ELEVATION. Not Applie | able | |
| <u> </u> | | | p4 | 7 | | <u> </u> | | 3 | | SOIL DESCRIPTION | 1 | |
| Asphalt | | | | | * | 100 | ١. | | XXXXXXX | Ashpalt | | |
| | | | <u> </u> | <u> </u> | | 100 | <u>} 1</u> | 1 | GW | Gravel - brown, dry, medium dense, coa | | |
| | | | | | + 🖫 | 100 | 2 | | 2000000 | poorly graded, non-plastic, no petroleur or discoloration | n odor, she | en, |
| | | | <u> </u> | | 1 | 100 | İ | 1 | SP | of discoloration | | |
| | 050 | 11:32 | 6.1 | ND/1,078 | * | 100 | 3 | | 100 | SAND - light brown, dry, medium dens | e, medium | |
| | | | ļ | | <u> </u> | 100 | ١. | | 1 | grained, poorly graded, non-plastic, no | petroleum | |
| | | | | <u> </u> | <u> </u> | 100 | 4 | 4 | bio esta | odor, sheen, or discoloration | | |
| | | <u> </u> | | | | _ | 1 | | ļ | | | |
| | | | | | | | | 1 | | Groundwater not encountered | | |
| | | | | | <u> </u> | | |] | | | | |
| 1 | | | <u> </u> | <u> </u> | | - |] | | } | Boring terminated at 4 feet bgs Boring abandoned with sand | | , |
| | | | | | | <u> </u> | <u> </u> | 1 | | Dotting apardoned with Sand | | |
| | | | | | | | | | | | | |
| | | _ | | | | | |] | | | | |
| | | | 1 | | ļ | ļ | <u> </u> | . | | | | |
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| | | | !. | <u> </u> | <u>. </u> | <u> </u> | | 1 | | • | | |
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| 1 | | | | | | | | | | | | İ |

5074 B-14-B-30 FINAL

| HAHN 434 NW | | | - | INC. | | | | so | | L BO | RING/PROBE NUMBER B-28 |
|------------------------|-------------------|----------|--|--|----------------|---------------|-----------------|--------------|-------------|------------------|---|
| Portlan | | | | | | | | | | <u></u> | |
| (503) 79 | • - | | | | H.A | ИL | OGGE | R: | | | Jason M. Greifer DRILL DRILL |
| PROJE | | | | | SA | MP | LING | MET | НО | D: | 4' Continous Core START FINISH |
| l ' | x Marit | ime Co | отрав | v | DF | | LING M | ETE | IOI | D: | Direct Push-Post Hole 0'-3' Time: Time: |
| | 0 NW S | | - | • | EG | UU | PMEN | r TY | PE | | Geoprobe 10:40 15:51 |
| | tland, C | | | | | | LER: | | | | Marcus Johnson Date: Date: |
| PROJE | | | 5074 | : | DF | ILI | LING C | INO | 'RA | CTOR: | Geo Tech Explorations, Inc. 25-May-01 25-May-0 |
| T. | | | E-I | F - 3 | | | | | H. | 1 | BORING DIAMETER: 2" |
| AE S | 田 张 | | ACI | UL. | P | AL | RY. | eet | ATI | V C | CASING DIAMETER: Not Applicable |
| NON' | SAMPLE NUMBER* | TIME | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | DW | STRATA (USCS) | SURFACE ELEVATION: Not Surveyed |
| NA NA | SAIN UIX | E | A G | H H H | OR | AT. | ည္ကြ | PT | 15 | | TOP OF CASING ELEVATION: Not Applicable |
| ABANDONMENT DETAILS | u z | | HE | LAB RESULT TPH-G, Total TPH Dx (ppm) | ٥ | | 图 | DE | GROUNDWATER | | COLL DECORPORION |
| Asphalt : | | | | <u> </u> | | | 100 | | ╀ | .1 | SOIL DESCRIPTION Ashpalt |
| | | | - | } | | | 100 | 1 | | | SAND - light brown, dry, loose, medium grained, |
| | | | | | L | | 100 | | | · SP | poorly graded, non-plastic, no petroleum odor, sheen, |
| | | | <u> </u> | 1 | 1 | | 100 | 2 | | | or discoloration |
| | | <u> </u> | <u></u> - | | - | 7 | 100 | 3 | | | |
| | | | | | | | 100 | | 1 | | CULT DANTS |
| | 069 | 15:01 | 25.3 | - | ` | | 100 | 4 | | SM | Silty SAND - as above, slight petroleum odor, no sheen or discoloration |
| | | ļ | | | - | | 100 | 5 | | k Siri | |
| | | ! | <u> </u> | <u></u> | | | 100 | | 1 | TE | SAND - light brown, dry, loose, medium grained, |
| | 070 | 15:04 | 28.1 | 0.0829/8 | | | 100 | , | | SP | poorly graded, non-plastic, petroleum odor, sheen, |
| | | <u> </u> | [| ,890 | ├ | | 100 | 6 | 4 | | and discoloration |
| | | | | | - | - | 100 | 7 | 1 | | |
| | | | | | | | 100 | | | | |
| | | <u> </u> | | | | _ | 100 | 8 | | 型音樂 | |
| | 071 | 15:08 | 58.8 | - | - | - | 100 | 9 | | SP | SAND - as above, petroleum odor, sheen, and |
| Chips | | | | | | | 100 | | 1 | | discoloration . |
| | | | | <u> </u> | | | 100 | 10 | | 10 TA | |
| Bento | - ' ' | | | | | _ | 100 | 11 | 1 | | |
| | | | |] | - | - | 100 | | 1 | 4.4 | 7,57 |
| | 072 | 15:09 | 76.5 | 4.24/ 24,540 | | | 100 | | | SP | SAND - as above, petroleum odor, sheen, and discoloration |
| | | | | 24,540 | | | 100 | 12 | } | | ansort autor |
| WB | | | | | | | 100 | 13 | | | |
| | | | | | | | 100 | | | | |
| | | | | | | _ | 100 | 14 | | | |
| | | | | - | | $ \downarrow$ | 100 | 15 | | 医 罗星 | |
| Willia. | <u> </u> | <u> </u> | | | | | 100 | | | | SAND - as above, petroleum odor, sheen, and |
| Willing. | 073 | 15:13 | 79.2 | | • | 7 | 100 | 16 | | SP | discoloration |
| | | | | | | | 100 | | | | |
| | | | | | | | 100 | 17 | | | |
| | | | | | | | 100 | 18 | | | |
| | | | | | | | 100 | | | SP | CAND, or shows not always always always and |
| | | | | | | _ | 100 | 19 | | OF T | SAND - as above, petroleum odor, sheen, and discoloration |
| | 074 | 15:18 | 97.0 | | | - | 100 | 20 | | 李龙 | |

5074 B-14-B-30 FINAL

| HAHN 434 NW Portlan | Sixth . | Avenu | | INC. | | | so | | L BO | RING/PROBE NUMBER | B-28 | |
|--|-------------------|----------|--------------------|--|--|-----------------|--------------|-------------|------------------|---|--------------|-----------|
| (503) 79 | 6-0717 | | | | HAI | LOGGE | R: | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SAM | PLING : | MET | но | D: | 4' Continous Core | START | FINISH |
| Bri | k Mariti | ime Co | ompan | y | DRIL | LING M | ŒTE | ЮІ |): | Direct Push-Post Hole 0'-3' | Time: | Time: |
| 903 | 0 NW S | t. Hel | ens Ro | oad | EQU. | IPMEN' | r TY | PΕ | | Geoprobe . | 10:40 | 15:51 |
| Por | tland, C | regon | | | DRIL | LER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | CT #: | | 5074 | · · · · · · · · · · · · · · · · · · · | DRIL | LING C | ľNO | RA | CTOR: | Geo Tech Explorations, Inc. | 25-May-01 | 25-May-01 |
| Į. | | | 囝 | E = 2 | l_ , | 54 | ₽ | ER | | BORING DIAMETER: 2" | · · - | |
| E S | SAMPLE NUMBER* | F-71 | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | CORE/SPT INTERVAL | RECOVERY (%) | DEPTH (feet) | GROUNDWATER | ₹ 6 | CASING DIAMETER: Not Appl | icable | |
| NAT I | MP. | TIME | ADSPA (ppm) | E C | EE/K | § § | 当 | Ď | RA SC | SURFACE ELEVATION: Not Surv | eyed | |
| | SAJ | E | IAI G | la H H | S E | EG | F | Ę | STRATA (USCS) | TOP OF CASING ELEVATION: Not Appl | icable | |
| ABANDONMENT DETAILS | 4 | | H | ALE | <u> Н</u> | | a | GR | | SOIL DESCRIPTIO | N | |
| | | | <u> </u> | <u> </u> | - | 100 | 21 | | | | | |
| | | <u> </u> | | | | 100 | 1 41 | 1 | SP | SAND - gray, most to wet, medium der grained, poorly graded, non-plastic, po | | |
| | | | | | | 100 | 22 | | | sheen, and discoloration | emoternit od | or, |
| \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | | | | | 100 | | | | , | | |
| | 075 | 15:26 | 43.2 | <u> </u> | | 100 | 23 | \searrow | | | | |
| | | | | | | 100 | 24 | | CL | Silty CLAY - light gray, moist, stiff, se petroleum odor, sheen, and discolorati | | |
| Ø ₽ Ø | | | | | | 100 | | | | perioteum odor, sheen, and discolorad | OII | |
| 3/8-inch Bentonite Chips | | | <u> </u> | <u> </u> | <u> </u> | 100 | 25 | 4 | | | | |
| | . <u> </u> | | | | | 100 | 26 | | | | | |
| and the second | | | | | | 100 | | 1 | | | • | |
| | 076 | 15:41 | 7.1 | <u> </u> | | 100 | 27 | | CL | Silty CLAY - as above, no petroleum o | dor, sheen, | or |
| | 010 | 10.41 | 7.1 | | V | 100 | 28 | | | discoloration | , | |
| | | | | | | | 29 | | | Boring terminated at 28 feet bgs | | |
| | | | | | | | 30 | | | Sampled to 27.5 feet bgs Boring abandoned with 3/4-inch Bento | nite Chips | i |
| | | | | | | | 31 | | | | | |
| | | | | | | | | 1 | <u> </u> | | | |
| | | | <u> </u> | | <u>f</u> | 1 | 32 | | | | | |
| | | | | | | | 33 | | } | | | |
| | | | | | | | 34 | | | | | |
| | | | | | | <u> </u> | 35 | | į | | | |
| | | | | | | | 36 | | | | | |
| | | | | | ! | <u> </u> | | | : | | | |
| | | | | | <u> </u> | | 37 | | | | | |
| } | | | | | | <u> </u> | 38 | | | | | |
| | | | | | | | 39 | | | | | |
| | | | | | | | 40 | | | | | |

5074 B-14-B-30 FINAL

| HAHN 434 NW | | | | цчС. | | | S | OΤ | L BO | RING/PROBE NUMBER B-29 | | | | | | |
|--|-------------------|--|--------------------|--|---|----------------|---------------|----------------|--|--|--|--|--|--|--|--|
| Portlan | | | .~ | | | | ~` | _ - | O. | The second secon | | | | | | |
| (503) 79 | - | | | | HAT | LOGG | CR: | | | Jason M. Greifer DRILL DRIL | | | | | | |
| PROJE | | | | | | IPLING | | 'HO | D· | 4' Continous Core START FINIS | | | | | | |
| | v Marit | ima C | mnon | | } | LLING | | | | | | | | | | |
| | o NW S | | - | - | | | | | J | | | | | | | |
| | | | | ad | H | ЛРМЕ <u>Р</u> | ATTI | 20 | | Geoprobe 10:20 14:57 Marcus Johnson Date: Date: | | | | | | |
| PROJE | tland, C | regon | 5074 | · | | LLER: LLING | CON | rr A | CTOR: | Marcus Johnson Date: Date: Geo Tech Explorations, Inc. 25-May-01 25-May- | | | | | | |
| | <u> </u> | _ | 001- | | 10101 | | T | | 7 | BORING DIAMETER: 2" | | | | | | |
| ABANDONMENT DETAILS | ⇔ * | | CE | LAB RESULT TPH-G, Total TPH Dx (ppm) | Ę | al≿ | et) | GROUNDWATER | | CASING DIAMETER: Not Applicable | | | | | | |
| ZS | SAMPLE NUMBER* | 图 | HEADSPACE (ppm) | | CORE/SPT | RECOVERY (%) | DEPTH (feet) | MA | STRATA (USCS) | | | | | | | |
| SE | | TIME | ADSPA (ppm) | E E E | | | 引員 | 浧 | ES ES | SURFACE ELEVATION: Not Surveyed | | | | | | |
| \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | NG SZ | | (EA | PH | 18 | 到題 | 営 | Ιğ | P | TOP OF CASING ELEVATION: Not Applicable | | | | | | |
| AB | | | 111 | 1758 | | | - | 5 | | SOIL DESCRIPTION | | | | | | |
| Asphalt | | | | | | 100 | i | | Asphalt GW | Ashpalt | | | | | | |
| | | | <u> </u> | | - | 100 | - | 1 | g GW | Craver brown, ary, measure assure, were graded, by | | | | | | |
| | | | | <u> </u> | | 100 | ⊸ ! | , | | minus, no petroleum odor, sheen, or discoloration | | | | | | |
| | | <u>!</u> | <u> </u> | <u> </u> | 100 | | | | | | | | | | | |
| | | | 1 | | SAND - light brown, dry, loose, medium grained, | | | | | | | | | | | |
| | | | | | | 100 | | 7 | SP | poorly graded, non-plastic, no petroleum odor, sheen, | | | | | | |
| | | | ļ | poorly graded, non-plastic, no petroleum odor, sheen, or discoloration | | | | | | | | | | | | |
| | | <u> </u> | | <u> </u> | } } | 100 | } | 5 | | | | | | | | |
| | | | | <u>:</u> | | 100 | | 7 | | | | | | | | |
| | | | | | | 100 | | 3 | 新疆 埃 | | | | | | | |
| | | | | | | 100 | | | SP | SAND - as above, no petroleum odor, sheen, or | | | | | | |
| | 063 | 14:10 | 0.0 | - | - | 100 | | 7 | Marine A | discoloration | | | | | | |
| | | | | | | 100 | _ | 3 | 100 | | | | | | | |
| | | | | | | 100 | | 1 | 3.5 | | | | | | | |
| Bentonite Chips | | 1 | | | | 100 | | ⊒ | | | | | | | | |
| | · | <u> </u> | | | | 100 | ⊣ | | 100 | | | | | | | |
| | | <u> </u> | <u></u> | - | | 100 | | 7 | | · | | | | | | |
| | | | | | ┼┼┼ | 100 | ⊣ ' | ιl | | | | | | | | |
| € [] | | | | | | 100 | _; | 1 | SP | SAND - as above, no petroleum odor, sheen, or | | | | | | |
| 3/8-inch | 064 | 14:21 | 4.7 | - | ▼ | 100 | | 4 | | discoloration | | | | | | |
| | | | | | | 100 | _ | , | | | | | | | | |
| | | <u>} </u> | | | i | 100 | | 4 | CONTRACT. | | | | | | | |
| | | | | | | 100 | | 4 | | | | | | | | |
| | | | | | ND/ND 100 15 SAND - as above, slight petroleum odor at 13', no petroleum sheen or discoloration | | | | | | | | | | | |
| WHII) | 065 | 14:28 | 3.3 | ND/ND | | | | | | | | | | | | |
| | | <u> </u> | | | | 100 | ⊣ ' | | | | | | | | | |
| | | | | | | 100 | 16 | 4 | | | | | | | | |
| | | - | | | - | 100 | 17 | - | | | | | | | | |
| UIIII) | | | | | | 100 | | 1 | | | | | | | | |
| | | | | | | 100 | | | SAND - as above, slight petroleum odor, no petroleum | | | | | | | |
| | 000 | 1400 | | | | 100 | | | SP | | | | | | | |
| Willia. | 066 | 14:33 | 5.8 | | | 100 | | 4 | | | | | | | | |
| Ullilli. | | | | <u></u> | 1 | 100 | | | | | | | | | | |

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5074 B-14-B-30 FINAL

| HAHN | | | - | INC. | | | | - | | | | | _ | |
|--------------------------------|-------------------|----------|--|--|--|----------|-----------------|--------------|-------------|--|-----------|---|------------------|-----------|
| 434 NW | Sixth A | Avenu | e | | | | | SC |)L | LB(|)] | RING/PROBE NUMBER | \mathbf{B} -29 | |
| Portlan | d, Oreg | on | | | | | | | | | | | | |
| (503) 79 | 6-0717 | | | | H/ | ΊL | OGGEI | R: | | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | CT: | | | | SA | MJ: | LING | VET: | но | D: | | 4' Continous Core | START | FINISH |
| Bri | k Mariti | me Co | mpan | у | DF | ILI | LING M | ETF | or | D: | | Direct Push-Post Hole 0'-3' | Time: | Time: |
| 903 | o nw s | t. Hel | ens Ro | ad | EG | נטו | PMENT | 'TY | PE | | | Geoprobe | 10:20 | 14:57 |
| Por | tland, C | regon | L | | | | LER: | | | | _ | Marcus Johnson | Date: | Date: |
| PROJE | CT #: | | 5074 | | DF | ILI | JNG C | ONI | 'RA | CTOR | : | Geo Tech Explorations, Inc. | 25-May-01 | 25-May-01 |
| Ę | 1110 | | (-) | T. | - | | | | 肾 | | | BORING DIAMETER: 2" | | |
| ME S | 甲类 | | | Cots Para | H | Ā | IRY | feet | A | N C | | CASING DIAMETER: Not Applic | able | |
| MAIN | API IBE | TIME | (ppm) | RESULT I.G. Total Dx (ppm) | | JRV | % (%) |)H | A | Z Z Z | 3 | SURFACE ELEVATION: Not Survey | yed | |
| | SAMPLE NUMBER* | E | HEADSPACE (ppm) | B F FE H D | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | S | STRATA | | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | ⁰ 2 | | H | LAB RESULT TPH-G, Total TPH Dx (ppm) | ٥ | Ħ | E | DE | GROUNDWATER |] " | i | COT DESCRIPTION | , | ·· |
| | | | 1 | | <u> </u> | | 100 | | ۲ | *ALC: PAGE | -6% | SOIL DESCRIPTION | · | |
| S/8-inch Bentonite Chips | - | | <u> </u> | | - | | 100 | 21 | | | 1 | | | |
| 3/8-inch Bentonite Chips | | | <u>'</u> | | İ | | 100 | | | 3,48 | 38 | | • | |
| 経は影 | | | <u> </u> | | | _ | 100 | 22 | | | | | 4. | |
| Se Be | 067 | 14:41 | 2.9 | ND/ND | | _ | 100 | 23 | L | SP | | SAND - dark gray, moist, medium den grained, poorly graded, non-plastic, sligh | | |
| linne l | 1001 | 14:41 | 2.9 | MDMD | | \vdash | 100 | 20 | 1 | | 7 | odor, no petroleum sheen, and no discol | | ш. |
| | | | | | 1 | | 100 | 24 | | | | , - | | |
| | | | | | | | 100 | | | | W | | | |
| | | | <u> </u> | <u> </u> | ! | - | 100 | 25 | 1 | | | | | |
| | | | | | | - | 100 | 26 | | | | | | |
| | | | | | | | 100 | | 1 | CL | 7 | Silty CLAY - dark gray, wet, stiff, slight | ly plastic. | no |
| | 068 | 14:48 | 1.1 | - | <u> </u> | | 100 | 27 | | | | petroleum odor, sheen, or discoloration | | |
| | | | | | | _ | 100 | 28 | | | Ø | | | |
| | | | | | <u> </u> | _ | | | 1 | The state of the s | 1 | Boring terminated at 28 feet bgs | | |
| [| | | | | _ | | | 29 | | | 1 | Sampled to 27 feet bgs | | |
| | | | | · | | | | 30 | | | ı | Boring abandoned with 3/4-inch Benton | ite Chips | |
| | | <u></u> | , | | — | | | - 30 | | | 1 | | | |
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5074 B-14-B-30 FINAL

| HAHN 434 NW Portlan | Sixth. | Avenu | | | | | | SC | Œ | L BO | RING/PROBE NUMBER | B-30 | |
|---|--|--|--|--|--------------|-----|-----------------|--------------|-------------|------------------|--|-------------|---------------|
| (503) 79 | | | | | HA | ΙL | OGGEI | : | | | Jason M. Greifer | DRILL | DRILL |
| PROJE | | | | | - | | LING | | HO | D: | 4' Continous Core | START | FINISH |
| | x Marit | ime C | mpan | v | - | | LING M | | | | Direct Push-Post Hole 0'-3' | Time: | Time: |
| ļ. | o NW S | | - | - | | | PMENT | | | | Geoprobe | 9:30 | 10:24 |
| | tland, C | | | | | | LER: | | | | Marcus Johnson | Date: | Date: |
| PROJE | | | 5074 | | | | ING C | ONT | RA | CTOR: | Geo Tech Explorations, Inc. | 24-May-01 | |
| Ē | ······································ | | | | | | | | K | | BORING DIAMETER: 2" | | · |
| ABANDONMENT DETAILS | 运选 | | HEADSPACE (ppm) | LAB RESULT TPH-G, Total TPH Dx (ppm) | ļĘ | Ā | RY | DEPTH (feet) | GROUNDWATER | ₩ ~ | CASING DIAMETER: Not Applic | able | |
| AIL | SAMPLE NUMBER* | TIME | ADSPA (ppm) | ES: 7. X | CORE/SPT | K | RECOVERY (%) | £ (£ | M | STRATA (USCS) | SURFACE ELEVATION: Not Surve | | · |
| 0.E | AM. | E | 3 3 | H. C. | E E | IE | ဥ ေ | H | E | E S | TOP OF CASING ELEVATION: Not Applic | | |
| BAD D | cy Z | | | | ၂ၓ | Z | RE | DE | 12 | 82 | The state of the s | | |
| ₹ | | | | | <u> </u> | | | | U | | SOIL DESCRIPTION | T | |
| Asphalt | | | | | | | 100 | | | Asphalt | Ashpalt | | |
| | | <u>!</u> | , | <u>!</u> | - | | 100 | 1 | | 建元增 | | | |
| | 007 | 9:34 | 3.9 | - | +- | | 100 | 2 | | SP | Silty SAND with some Gravel - light by medium dense, medium grained, poorly | | |
| | | 1 | | | 1 | 7 | 100 | | | | plastic, no petroleum odor, sheen, or dis | | |
| | | | | | _ | | 0 | 3 | | * | F, [| | |
| | | | <u> </u> | ļ | - | | 0 | ١, | 1 | | | | |
| | | | · | <u> </u> | <u> </u> | | 100 | 4 | 4 | | Silty SAND with some Gravel - as above | ze slight | |
| | 008 | 9:40 | 7.4 | ND/- | | | 100 | 5 | | SP | petroleum odor, no sheen, and no discole | | |
| | | ļ <u></u> | ì | | ļ | | 100 | |] | | | | |
| | | | ! | | <u> </u> | | 100 | 6 | | | | | |
| | - | | 1 | | - | | 100 | 7 | | 10-45 | | | |
| | | | 1 | <u> </u> | $\dot{\top}$ | | 100 | <u> </u> | 1 | | | | |
| | | <u> </u> | i | | 1 | 7_ | 100 | 8 | | | | | |
| | | | | | | | 100 | | | | | | |
| Chips Chips | | <u> </u> | <u> </u> | | ļi | | 100 | 9 | | | | | |
| | 009 | 9:48 | 4.6 | <u> </u> | - | | 100 | 10 | | SP | Silty SAND with some Gravel - as abov petroleum odor, no sheen, and no discolo | | |
| ntonite | 005 | 5.46 | 1 7.0 | | i | | 100 | | 1 | 4 | pen oleum odor, no sneem, and no discolo | Lanon | |
| $\mathbb{Z}_{\mathbb{R}}$ | | | | | | | 100 | 11 | | | | | |
| | | | | | | | 100 | | 1 | | | | |
| $\mathbb{Z}_{\overline{i}}^{s}\mathbb{Z}$ | | <u> </u> | <u> </u> | <u> </u> | 1 | | 100 | 12 | | | | | |
| | | | ! | | - | | 100 | 13 | | | | | |
| | | - | <u>. </u> | <u> </u> | + | | 100 | 13 | 1 | 性態 | | | |
| | 010 | 9:54 | 4.7 | ND/- | + | | 100 | 14 | | SP | Silty SAND with some Gravel - as above | | |
| | | | 1 | | | | 100 | | 1 | | petroleum odor, no sheen, and no discolo | radon | |
| | | | | 1 | | | 100 | 15 | | | | | |
| | | - | | | + | _ | 100 | 10 | | | | | |
| | | | <u> </u> | | | | 100 | 16 | | | | | |
| | | | | | + | | 100 | 17 | | | | | |
| | | | | | | | 100 | | 1 | | | | |
| | | | | | | | 100 | 18 | | | GUL GAND | 1. 7. | |
| | 0.5.5 | | 1 - | | | _ | 100 | | | SP | Silty SAND with some Gravel - as above petroleum odor, no sheen, and no discolo | | |
| | 011 | 10:04 | 4.5 | - | + | | 100 | 19 | | 7777777 | реживани оциг, по знеен, яни по инсом | rannn | |
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| | V Sixth . | Avenu | | INC | | | | | sc |)I) | LB | O1 | RING/PROBE NUMBER | B-30 | |
|--------------------------------|---------------------|----------|---|--------------|------------------------------|---|-----------|--|--------------|-------------|--------------|-----|--|---------------|-----------------|
| Portlan | id, Oreg 96-0717 | | | | | - | . T T | OGGE | | | | | Jason M. Greifer | DDITZ | |
| PROJE | | | | | | +- | | LING | | HO: | D. | | 4' Continous Core | DRILL | DRILL |
| | x Marit | ime C | nmnan | 177 | | ļ | | LING M | | | | | Direct Push-Post Hole 0'-3' | Time: | FINISH Time: |
| 1 | O NW S | | - | - | | \vdash | | PMENT | | | - | | Geoprobe | 9:30 | 10:24 |
| 1 | tland, C | | | ,,,, | | | | ER: | | | | | Marcus Johnson | Date: | Date: |
| PROJE | | <u></u> | 5074 | : | | 1 | | LING C | гио | RA | CTO | R: | Geo Tech Explorations, Inc. | 24-May-01 | |
| Ę | | | (- 3) | E- | = 3 | | | [| | 갦 | | | BORING DIAMETER: 2" | | |
| ME | 母為 | | P C | 15 | Pota ppr | PT | AL | J.R.Y | feet | AT | ∢ | æ | CASING DIAMETER: Not Applic | able | |
| AII | API BE | TIME | ADSPA (ppm) | | 5, S | E/S | ľRV | % % | H, | ŪΨ | \ | SCS | SURFACE ELEVATION: Not Surve | yed | |
| | SAMPLE NUMBER* | | HEADSPACE (ppm) | LAB RESULT | TPH-G, Total TPH Dx (ppm) | CORE/SPT | INTERVAL | RECOVERY (%) | DEPTH (feet) | | STRATA | Ð, | TOP OF CASING ELEVATION: Not Applic | able | |
| ABANDONMENT DETAILS | 2 | | H | IA | | 0 | = | R | ā | GROUNDWATER | | | SOIL DESCRIPTION | I | |
| | | | | | | | | 100 | | | | | | | |
| | | | | | | - | - | 100 | 21 | 4 | | | | | |
| 3/8-inch Bentonite Chips | | | | - | | ÌΤ | - | 100 | 22 | | | | | • | |
| Ø į į | | | | | | | | 100 | | 1 | | | Silty CLAY - light gray, moist, medium | stiff, slight | lv |
| | 012 | 10:17 | 1.1 | <u> </u> | | <u> </u> | L | 100 | 23 | | (C. | | plastic, no petroleum odor, sheen, or dis | | |
| | | <u> </u> | | - | | | _ | 100 | 24 | | | | | | |
| | | | | | | <u> </u> | | | | | | 200 | | | |
| | | | | <u> </u> | | <u> </u> | | <u> </u> | 25 | | | | Groundwater not encountered | | |
| 1 | | | | | | | | | 26 | | | | | | |
| | | | | | | <u> </u> | | | 27 | | | | Boring terminated at 24 feet bgs Sampled to 23 feet bgs | | |
| 1 | | <u> </u> | | | | ÍΤ | | <u>!</u> | 2. | 1 | | | Boring abandoned with 3/4-inch Benton | ite Chips | |
| | | | | | | | | | 28 | | | | | - | |
| | | l | | | | | _ | | 29 | | | | | | |
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BRIX 001277

5074 B-14-B-30 FINAL

Hahn and Associates, Inc.

Seil

| HAHN ANI | O ASSOCIATES | , INC. | | La | bora | atory | ESL | | • | | | CHAI | NOF | Cī | USTODY |
|-------------------------|--|----------------|--------------------|--------------|----------------------|-----------------------------------|-------------|--|--|--|--|---------------------------------------|-------------------------------------|----------|---------------|
| 1 | mental Manageme | | | | | | | | | | _ | | | • | 2010Di |
| 1 | iue, Suite 203 - Portian | | | Lab | Pro | ect No. | | JL051 | 110 | | - | Chaun of (| Custody | Na | 1 |
| II. | 0717 • Fax (503) 227-22 | | | | | | | | · (D | | - | | | . 141 | |
| | , Tanz | | L | id mig | with | Sedim | ent Sam | pie | | | Samples | Received at | €C (Y o | r Ni | - |
| Project No. 507- | | | T _ | - | | lizrate | | Taxt Sedim | reat | Test Bat | F | ate Contain | | | т V; |
| , · — | Maritime Familia | |] 1 | ulti-F | has | e Sampi | e | _ | | | Provide 1 | erbal Resul | ita (Yor | N, | |
| Collected by Jay | Greuler | | | ··········· | Test (|)ис (мупер | | Test Separ. | ately | Shake | Provide ? | rejian nary | Fax Res | પોદક | |
| Sample Number Pr | -6 | | Mat | rix | | | | Α. | naivses | to be Perform | ed | | | <u> </u> | |
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| | -010524 | | | : | | <u> </u> | t | | - | - | <u>;</u> = . | | Method | | |
| PIEASE CX | ALLOR C | ۸ x. | Ì | 1 | | by NW TPH Hydrocarhon fication | | 1 1 | Ē | - C 1 - 2 - 1 - | 1 2 | : ! - -e | ерл М | | , |
| | | | ! | 1 | | /dT00 | • | | ž, | 7.96 A M. A | | etho | ٠ ج | | 1 |
| TPH-6 | X RESU | 113_ | | 1 | E. | = . | į |] } | <u> </u> | 医神经炎 | 7. 18. Z. | Ť. | | i |
| الديخالان | AVAILA | 3 LE - | | | ntair | Ė | ! ! | | 륄굨 | ED. 1,2 | λη 14 8 | . E | = | | |
| WITCH | AC ANAL | YISES | | 1 | Co | N. N. | 9 | ě | 302 I | Ferre Ferre Albert | a tr | 를 다 | 11.0 | | |
| ADDITION MA | 1 00116 | , | = | : , | Runber of Containers | ICID by NW Identification | D.H.J.L MN | NW TPII-Dx | RTEX and unphilatene by Elta Method 80218 | BTBX, EDU, EDC MTBE, naphthalene, 1,2,4-and f.J.S. trioethyllenavene, 10 and 11 propylbonzone by EPA Methol B26011 | Polynucton: Aromatic Hydrocucl (PAHS) by BPA 8270 SIM | Total Land by EPA Method GO 102007 | Dissulved Lend (CP) by 6010/2007 | F | |
| MA | Y tollow | • | Soft | Other | Z en | IICID Identif | | MA N | HTE Med | BTBX, mapliff trimeti propyff B26015 | Poly IPAI | Toth | Dass GUIC | RUSH | |
| | Date · Time Sam | | 1 1 | | ٠,- | | <u></u> _ | ì | <u> </u> | | | | | | Remarks |
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| 05 005 1 | 9031 | 18 | 1 | | | | * | | | | . ! | | | | |
| 06:006 | 914 - | 23 | 111 | | 77 | | 34 | * | | | | | | | |
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| 07 1207 | | 100 B | [: - | <u> </u> | -{-} | ·· | tik) | ļ | | | | -JE3 | } | | |
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| 09 009 | 948 | 10 | | _ | 44 | | | | | | <u>_</u> | | | | |
| 10 1010 | 454! | 14 | | | | | * | | | | | | | | |
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| 14 014 | | 7 | _ | | ╂╂ | | | * | | | | | | + | |
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| 16 016 | 1044 | 15/3 | | _ _ | \coprod | <u> </u> | * | | <u>-</u> <u>-</u> | | <u> </u> | | | _ | |
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| 25025 | 1156 | 15/2 | }} . | | | | * | | ! | | | 1 | | | |
| 26 03 6 telinguished by | - 1/203: V | 19 | | | H | | , | | | | | Ī | | \top | |
| telinguished by | Compa | OSSA & NELH VA | c j | 5 / | 25 | 181 | ще | | ceived by | | | | npany | | , |
| telinquished by | Compa | ру |] | Date | | Ţ | ime | - Re | Gived Dy | TANZ | 7)A. | Can | /AI | | |
| 60K 7ANZ | HA. | Σ | | <u>2/5</u> | 5/ | 01 | 1130 | , | 1 10 | Pelle _ | <u> </u> | 11 | | <u>E</u> | <u> </u> |
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BRIX 001279

Confidential Business Information

Soil

| Project Name | HAHN AND | ASSOCIAT | ES, INC. | | .I. | bors | tory | ESL | | | | _ - | CHAI | N OF | Ct | JSTODY |
|--|--------------------|--|--------------------|---|-----------|--------------------|----------------------------------|--------------|--|---------------------------------------|---|----------------------------|-------------------|------------------------|----------|--------------|
| Project Manager | 434 NW Sixth Avenu | e. Suite 203 - Por | dand OR 97209 | | La | b Proj | ect No. | | <u> </u> | 5118 | | - | Chain of | Custody | No | 2_ |
| Project Name | (503) 796-07 | 17 - Fax (503) 22 | 7-2209 | , - - | | | | | | | | Γ | | | | |
| Project Name Service | · · | | | - L | iqui | | | ent Sam | | | Test Bot | 1 | | | | |
| Sample Date Time Sample Date Time Sample Description Table | | Manume Facility | | M | ızlti. | - | | ie. | - 1885 34 | пишел | | 1 | | | | L141 |
| SEE NOTE PAGE SEE NOTE PAGE SEE NOTE PAGE SEE NOTE PAGE SEE NOTE PAGE SEEN HILL AND STALL STA | | | · |] _ | | | - | | Test 5 | paracely | Shake | ľ | | | | |
| SEE NOTE PAGE /. SEE NOTE PAG | | | | Mar | riz | 1 | | | | Analyses | to be Perform | ed | | | | |
| 18 18 18 18 18 18 18 18 | !! / | | İ | | | 1 | | | | | ; | 1 2 | 1 | - | | ł |
| Lab (D) Sample Date Time Sample Description | | | = /. | | | r of Containers | ny NW TPH Hydrocarbon Ication | . 91 | | of Dr. and haptelindene by EPA 180218 | BDB, BDC, NTBB, raleue, 1,2,4 and 1,3,5 hyllenrane, 190-nnd u, nbenzene by EFA Methad | clour Aromatic Hydrocarhos | and by BPA Method | ed Lead (FF) by M.7 | | |
| Lab (D) Sample Date Time Sample Description | | | | Suil | Other | Munibe | HCID I | . 32 | İ | NW TH BTEX Methor | IFFEX, napled trined propyll S260B | Potymus (PAHs) | Fotal (| Dissolv 5010/2 | E GEN | |
| 28 1023 1129 | Lab ID Sample # D: | ate Time! | Sample Description | | ! | - | | i | '! | | 1 | | | | - | Remarks |
| 28 1023 1129 | 27 1037 55 | 4/01 1714 V | 3/90211/2 | 1 | | 7 | _ | * | ·3/r | • | 1 | | | i | T | |
| 29 024 1404 1300 2 3 30 | | 1179 | + 26 | 1,1 | | , | · · · · · | | | : - :- | r | | • | | 1 | |
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| June 07, . | 4001 | | | | | | | |

Mr. Guy Tanz
Hahn and Associates
434 NW Sixth Avenue
Suite 203
Portland, OR 97209
TEL: (503)796-0717
FAX (503) 227-2209

RE: 5074/Brix Maritime Facility

Dear Mr. Guy Tanz,

Environmental Services Laboratory received 42 samples on 5/29/01 for the analyses presented in the following report.

Order No.: 0105118

The Samples were analyzed for the following tests:

GAS/BTEX, Soil (8015/8021) HCID Soil (EPA 8015) ICP Metals (EPA 6010B)

NWTPH-Dx Soil (EPA 8015)

PERCENT MOISTURE (SM 2540)

Volatiles by GC/MS (EPA 8260B)

There were no analytical problems encountered, and all data met laboratory QC criteria, unless noted in a Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval of the Laboratory. The following checked data sections are included in this report, and numbered to indicate total pages within each report section.

Base Sample Report __Method Blank Report __Sample Duplicate Report __Matrix Spike/Matrix Spike Duplicate Report __Laboratory Control Spike/Spike Duplicate Report __Continuing Calibration Verification Report __Initial Calibration Verification Verification Report __Initial Calibration Verification Ve

If you have any questions regarding these test results, please feel free to call.

Sincerely,

BRIX 001281

June 07, 2001

Mr. Guy Tanz Hahn and Associates 434 NW Sixth Avenue Suite 203 Portland, OR 97209

TEL: (503)796-0717 FAX (503) 227-2209

RE: 5074/Brix Maritime Facility

Dear Mr. Guy Tanz, Nichole Karl Project Manager

Nichole Kerl

Order No.: 0105118

Technical Review

Keith Hunter

BRIX 001282

Date: 13-Jun-01

CLIENT:

Hahn and Associates

Client Sample ID: 5074-010524-002

Lab Order:

0105118

Tag Number:

Project:

5074/Brix Maritime Facility

Collection Date: 5/24/01

Lab ID:

0105118-02A

Matrix: SOIL

| Analyses | Result | Limit Qi | ial Units | ÐF | Date | Analyzed |
|------------------------|-----------|--------------|-------------------------------|-----|---------|--------------|
| HCID SOIL | N | IW-TPH | | | | Analyst: smc |
| Oil | ND | 123 | mg/Kg-dry | 1 | 5/30/01 | - |
| Gasoline | DETECT | 24.7 | mg/Kg-dry | 1 | 5/30/01 | |
| Diesel | ND | 61.7 | mg/Kg-dry | 1 | 5/30/01 | |
| Surr: O-Terphenyl | 113.0 | 50-150 | %REC | 1 | 5/30/01 | |
| NWTPH-DX SOIL | N | IW TPH-DX | | | | Analyst: smc |
| Diesel | ND | 24.7 | mg/Kg-dry | 1 | 5/30/01 | • |
| Oil | ND | 61.7 | mg/Kg-dry | 1 | 5/30/01 | |
| Surr: O-Terphenyl | 93.0 | 50-150 | %REC | 1 | 5/30/01 | |
| GAS/BTEX, SOIL | E | PA 8015/8021 | 1 | | | Analyst: jlw |
| Gasoline | 1370000.0 | 61700 | μg/Kg-dry | 500 | 5/29/01 | |
| Surr: Trifluorotoluene | 117.1 | 50-150 | %REC | 500 | 5/29/01 | |
| PERCENT MOISTURE | S | M2540 | | | | Analyst: etw |
| % Moisture | 19 | 0. | wt% | 1 | 5/30/01 | - |

Qualiflers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

J - Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

E - Value above quantitation range

* - Value exceeds Maximum Contaminant Level

I of 13

BRIX 001283

Date: 07-Jun-01

CLIENT:

Hahn and Associates

Lab Order:

0105118

5074/Brix Maritime Facility

Project: Lab ID:

0105118-02B

Client Sample ID: 5074-010524-002

Tag Number:

Collection Date: 5/24/01

Matrix: SOIL

| Analyses | Result | Limit Qu | ıal Units | DF | Date Analyzed |
|----------------------------|--------|----------|----------------|----|---------------|
| ICP METALS | E | PA 6010B | | | Analyst: Imc |
| Lead | 4.40 | 1.00 | mg/Kg | 1 | 6/1/01 |
| VOLATILES BY GC/MS | E | PA 8260B | | | Analyst: tmh |
| 1,2,4-Trimethylbenzene | 59,800 | 25.0 | μg/Kg | 25 | 5/30/01 |
| 1,2-Dibromoethane | ND | 25.0 | μg/Kg | 25 | 5/30/01 |
| 1,2-Dichloroethane | ND | 25.0 | µg/Kg | 25 | 5/30/01 |
| 1,3,5-Trimethylbenzene | 18,700 | 25.0 | μg/Kg | 25 | 5/30/01 |
| Benzene | 5,200 | 25.0 | μg/Kg | 25 | 5/30/01 |
| Ethylbenzene | 23,400 | 25.0 | μ g/ Kg | 25 | 5/30/01 |
| Isopropylbenzene | 2,580 | 25.0 | µg/Kg | 25 | 5/30/01 |
| m,p-Xylene | 96,500 | 50.0 | μg/Kg | 25 | 5/30/01 |
| Methyl tert-butyl ether | ND | 50.0 | μg/Kg | 25 | 5/30/01 |
| n-Propylbenzene | 11,100 | 25.0 | μg/Kg | 25 | 5/30/01 |
| Naphthalene | 11,100 | 50.0 | μg/Kg | 25 | 5/30/01 |
| o-Xylene | 38,400 | 25.0 | µg/Kg | 25 | 5/30/01 |
| Toluene | ND | 25.0 | µg/Kg | 25 | 5/30/01 |
| Surr: 4-Bromofluorobenzene | 108.6 | 74-121 | %REC | 25 | 5/30/01 |
| Surr: Dibromofluoromethane | 98.2 | 80-120 | %REC | 25 | 5/30/01 |
| Surr: Toluene-d8 | 105.0 | 81-117 | %REC | 25 | 5/30/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

CLIENT:

Hahn and Associates

Client Sample ID: 5074-010524-005

Lab Order:

0105118

Tag Number:

Project:

Collection Date: 5/24/01

5074/Brix Maritime Facility

Date: 07-Jun-01

Lab ID:

0105118-05A

Matrix: SOIL

| Analyses | Result | Limit Qual | Units | DF | Date Analyzed |
|------------------------|--------|--------------|-------|----|---------------|
| GAS/BTEX, SOIL | E | PA 8015/8021 | | | Analyst: jlw |
| Benzene | ND | 2.72 | μg/Kg | 1 | 5/31/01 |
| Ethylbenzene | ND | 2.72 | μg/Kg | 1 | 5/31/01 |
| Toluene | ND | 2.72 | μg/Kg | 1 | 5/31/01 |
| Xylenes, Total | ND | 8.15 | μg/Kg | 1 | 5/31/01 |
| Gasoline | ND | 543 | μg/Kg | 1 | 5/31/01 |
| Surr: Trifluorotoluene | 110.7 | 70-130 | %REC | 1 | 5/31/01 |
| PERCENT MOISTURE | 5 | M2540 | | | Analyst: etw |
| % Moisture | 8 | 0. | wt% | 1 | 6/4/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

J - Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

E - Value above quantitation range

* - Value exceeds Maximum Contaminant Level

Date: 07-Jun-01

CLIENT:

Hahn and Associates

Lab Order:

0105118

Project:

5074/Brix Maritime Facility

Lab ID:

0105118-06A

Client Sample ID: 5074-010524-006

Tag Number:

Collection Date: 5/24/01

Matrix: SOIL

| Analyses | Result | Limit Qu | al Units | DF | Date Analyzed |
|------------------------|--------|--------------|----------------|----|---------------|
| NWTPH-DX SOIL | N | W TPH-DX | ·· <u>-</u> ·· | | Analyst: smc |
| Diesel | ND | 26.7 | mg/Kg-dry | 1 | 5/30/01 |
| Oil | ND | 66.7 | mg/Kg-dry | 1 | 5/30/01 |
| Surr: O-Terphenyl | 75.0 | 50-150 | %REC | 1 | 5/30/01 |
| GAS/BTEX, SOIL | E | PA 8015/8021 | | | Analyst: jlw |
| Gasoline | ND | 667 | μg/Kg-dry | 1 | 5/29/01 |
| Surr: Trifluorotoluene | 90.4 | 50-150 | %REC | 1 | 5/29/01 |
| PERCENT MOISTURE | S | M2540 | | | Analyst: etw |
| % Moisture | 25 | 0. | wt% | 1 | 5/30/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Date: 07-Jun-01

CLIENT:

Hahn and Associates

Lab Order: 01

0105118

5074/Brix Maritime Facility

Project: Lab ID:

0105118-08A

Client Sample ID: 5074-010524-008

Tag Number:

Collection Date: 5/24/01

Matrix: SOIL

| Analyses | Result | Limit Qual | Units | DF | Date Analyzed |
|------------------------|--------|--------------|-----------|----|---------------|
| ICP METALS | E | PA 6010B | | | Analyst: Imc |
| Lead | 5.89 | 1.23 | mg/Kg- | 1 | 6/1/01 |
| GAS/BTEX, SOIL | E | PA 8015/8021 | | | Analyst: jlw |
| Gasoline | ND | 617 | μg/Kg-dry | 1 | 5/29/01 |
| Surr: Trifluorotoluene | 88.2 | 50-150 | %REC | 1 | 5/29/01 |
| PERCENT MOISTURE | 8 | M2540 | | | Analyst: etw |
| % Moisture | 19 | 0. | wt% | 1 | 5/30/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

CLIENT:

Hahn and Associates

Lab Order:

0105118

Project:

5074/Brix Maritime Facility

Lab ID:

0105118-10A

Date: 07-Jun-01

Client Sample ID: 5074-010524-010

Tag Number:

Collection Date: 5/24/01

Matrix: SOIL

| Analyses | Result | Limit Qu | ıal Units | DF | Date Analyzed |
|------------------------|--------|---------------|-----------|-------------|---------------|
| GAS/BTEX, SOIL | | EPA 8015/8021 | | | Analyst: jlw |
| Gasoline | ND | 543 | µg/Kg-dry | 1 | 5/29/01 |
| Surr: Trifluorotoluene | 91.3 | 50-150 | %REC | 1 | 5/29/01 |
| PERCENT MOISTURE | | SM2540 | | | Analyst: etw |
| % Moisture | 8 | 0. | wt% | 1 | 5/30/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Date: 07-Jun-01

CLIENT:

Hahn and Associates

Lab Order:

0105118

5074/Brix Maritime Facility

Project: Lab ID:

0105118-14A

Client Sample ID: 5074-010524-014

Tag Number:

Collection Date: 5/24/01

Matrix: SOIL

| Analyses | Result | Limit Qua | al Units | DF | Date Analyzed |
|-------------------|--------|-----------|-----------|--------------|---------------|
| NWTPH-DX SOIL | N | IW TPH-DX | | | Analyst: smc |
| Diesel | ND | 23.5 | mg/Kg-dry | 1 | 5/30/01 |
| Oil | ND | 58.8 | mg/Kg-dry | 1 | 5/30/01 |
| Surr: O-Terphenyl | 84.0 | 50-150 | %REC | 1 | 5/30/01 |
| PERCENT MOISTURE | S | M2540 | | | Analyst: etw |
| % Moisture | 15 | 0. | wt% | 1 | 5/30/01 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range